TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE

CALTRANS · BAY AREA TOLL AUTHORITY · CALIFORNIA TRANSPORTATION COMMISSION

Revised Final Agenda

TBPOC MEETING
October 3, 2013, 10:00am – 1:00pm
325 Burma Road, Oakland CA
TBPOC-PMT pre-briefing: 10:00am – 11:00am
TBPOC meeting: 11:00am – 1:00pm

	Topic	Presenter	Time	Desired Outcome
1.	**CHAIR'S REPORT**	S. Heminger, BATA		Information
2.	**CONSENT CALENDAR**			
	a. TBPOC Conference Call/ Meeting Minutes	A. Fremier, BATA		Approval
	1. TBPOC August 12, 2013 Minutes*			
	2. TBPOC August 13, 2013 Minutes*			
	3. TBPOC August 14, 2013 Minutes*			
	4. TBPOC August 15, 2013 Minutes*			
	5. TBPOC August 20, 2013 Minutes*			
	6. TBPOC August 22, 2013 Minutes*			
	7. TBPOC August 25, 2013 Minutes*			
	8. TBPOC August 27, 2013 Minutes*			
	9. TBPOC August 28, 2013 Minutes*			
	10. TBPOC August 29, 2013 Minutes*			
	11. TBPOC August 30, 2013 Minutes*			
	12. TBPOC August 31, 2013 Minutes*			
	13. TBPOC September 1, 2013 Minutes*			
	b. Contract Change Orders (CCOs)	D. Noel, CTC		Approval
	1. SAS CCO 98-S0 (Tower Skirt Modifications)*			
	2. SAS CCO 289-S0 (Tower Fender and Footing Modifications)*			
3.	**SAN FRANCISCO-OAKLAND BAY BRIDGE UPDATES**			
	a. E2 Update			
	1. E2 Budget/ Testing***	T. Anziano, CT	15 min	Approval
	2. Anchor Rod Testing Program CCOs***	T. Anziano, CT	15 min	Approval
	b. CCO 160 Update	T. Anziano, CT	15 min	Information
	c. Corridor Update/ Schedule*	T. Anziano, CT	15 min	Information
	d. Demolition Update	B. Maroney, CT	15 min	Information
	e. Bike Path & Parking Update***	T. Anziano, CT	10 min	Information
	1. OTD2 CCO 119 – Stage 3 Impacts and Mitigation***	D. Noel, CTC	10 min	Approval
4.	**OTHER BUSINESS**			
	a. Original Bay Bridge Troll Update*	A. Fremier, BATA	10 min	Approval

Topic	Presenter	Time	Desired Outcome
Next TBPOC Meeting: November 7, 2013, 10:00am – 1:00pm			

* Attachments
**Attachments at front of binder
***Attachments to be sent under separate cover

TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE
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Memorandum

TO: Toll Bridge Program Oversight Committee (TBPOC) **DATE:** September 30, 2013

FR: Tony Anziano, Toll Bridge Program Manager, Caltrans

RE: Agenda No. - 3a1

Item- E2 Update – E2 Budget/Testing
Pier E2 Shear Key S1 & S2 Anchorage Update
Anchor Rod Testing Program Budget Authorization Request

Recommendation:
APPROVAL

Cost:
Anchor Rod Testing Program (Capital Outlay) $8,750,000

Anchor Rod Testing Program: (For Approval)

	Budget	2nd Qtr. Risk (50% Prob.)
Capital Outlay:	$ 8,750,000	$12,850,000 Range $2.05 to 25M

E2 Shear Key Work: (Informational)

	Budget	2nd Qtr. Risk (50% Prob.)
Capital Outlay:	$18,000,000	$21,600,000 Range $15 to 30M

Anchor Rod/E2 Support Costs: (Informational)

	Budget	2nd Qtr. Risk (50% Prob.)
Capital Outlay Support (COS):	$5,000,000	$9,300,000 Range $7.1 to 11.5M

*COS split 50/50 between Anchor Rod Testing and E2 Shear Key Work

Schedule Impacts:

Anchor Rod Testing Program:

The A354 Grade BD anchor rod testing program for the 17 locations on the SAS Structure is made up of five different test groups:

- Test I — Field "in-situ" Hardness Tests
- Test II — Laboratory Tests on Anchor Rod Tails and Spares
- Test III — Laboratory Tests on Full Size Anchor Rods
- Test IV — Stress Corrosion Tests (Townsend Test)
- Test V — Incremental Step Loading Technique Tests

Work has been proceeding with the substantial completion of Tests I, II, & III. The first of the Test IV tests (4 Pier E2 2010 anchor rods - SAS A354BD Bolt Tests, ID #2) have been performed with post mortem examination in progress. Additional Test IV tests are scheduled to begin as the remaining testing frames and equipment are procured and installed on site. The logistics of performing Test V are in the process of being worked out to allow this testing to commence. At this point, the testing program (Tests I thru V) is anticipated to be complete March/April 2014 with a final report to follow in 3rd/4th quarter of 2014.

E2 Shear Key Work:

The critical path for the E2 Shear Key work continues through saddle fabrication with fabricators, XKT Engineering and Steward Machine Company, working aggressive schedules. While, field work has been progressing on a non critical basis, the first two upper saddle sections have been received and erected into place. However, as presented at the September 18, 2013 weekly Pier E2 Shear Key meeting the fabrication duration has increased by approximately three weeks requiring an adjustment in the estimated completion date to February 17, 2014 with the Shear Key S1 and S2 anchorage saddle system structurally in service December 31, 2013 (previously reported in the July 10th update as January 28, 2014 and December 11, 2013, respectively).

The Design/Construction team continues to work collaboratively to address all constructability issues as they arise.

Discussion:

Anchor Rod Testing Program Budget Request

The TBPOC approved $1,000,000 (May 9th) to get work started on the testing of the ASTM A354 Grade BD bolts. Because of the urgency of this work the Department has been aggressively pursuing this testing program. The costs for this testing have been

reevaluated with the current estimate at $8,750,000 for the capital costs. This estimate includes a 25% contingency for the capital costs. The majority (approx. 90%) of the capital costs are associated with Test IV. All costs associated with Test V are covered within the capital outlay support budget for the Anchor Rod Testing Program and E2 Shear Key Work.

This request is consistent with risk management risk register.

Risk Management:

Anchor Rod Testing Program:

The SAS risk register carries a risk for the testing of ASTM A354 Grade BD Rods in the range of $2.05M to $25M to address testing and remedial actions as necessary. The cost of this change is within the range contemplated for this risk. This change is only a portion of the potential changes addressed by this risk.

E2 Shear Key Work:

The SAS risk register carries risk for the construction of a retrofit for shear keys S1 & S2 at Pier E2. This risk, "Fabricate and Install a Retrofit for Shear Key bolts at Pier E2", is in the range of $15M to $30M and was created to address the fabrication and installation of the new saddle design. The cost of this change is within the range contemplated for this risk.

Anchor Rod/E2 Support Costs

The Capital Outlay Support Risk Register has three (3) risks related to the E2 Shear Key Work and the Anchor Rod Testing Program. Risk SAS-39 carries risk in the range of $2.4M to $3.6M to provide support for the Anchor Rod Testing Program. Risk SAS-41 carries risk in the range of $2.4M to $3.6M to address the E2 Shear Key Work. Risk SAS-09 carries risk in the range of $2.3M to $4.3M and is intended to address the additional support required should there be schedule impacts to all contemplated work. Adding these three (3) risks together provides for an overall risk range of $7.1M to $11.5M.

Any schedule impacts to contract completion related to this issue is covered under a separate risk - "Schedule: Potential delay during construction - Post Seismic Safety Opening (SSO)". This risk carries a range of $22M to $44M and is intended to address delays to contract completion for several risk issues and not necessarily this risk alone.

Attachment(s):

1. Anchor Rod
    a. CCO Tracking Status Sheets
    b. Testing Program (SAS A354BD Bolt Tests)
2. Pier E2 Shear Key S1/S2 CCO Tracking Status
    a. CCO Tracking Status
    b. Schedule Update (3013-09-18)

Anchor Rod CCO Tracking Status

CCO NO.	Description	Reference	Work Performed By	Method of Payment	Order of Magnitude (ongoing discussions with ABFJV)	CCO Net Dollar Amount (Adds & Credits)	Date of TBPOC Approval	Executed Date
Testing/ Rod Replacement								
312	Furnish Anchor Rods	Furnishing twenty (40) replacement ASTM A354 Grade BD anchor bolt assemblies for the Pier E2 (Crossbeam 18) Shear Keys and Bearings. 8 replacement rods for shear keys/bearings. Additional rods for testing and spares.	Dyson	EWFA	$ 200,000.00	$ 200,000.00		
314	Remove, Replace & Test Sample Rods	Perform field work to 1.) Removing galvanizing from the top of anchor rods for insitu hardness testing then replacing the galvanizing that was removed with inorganic zinc primer, 2.) Remove rods for testing and perform tests, 3.) purchase spare rods for testing, 3.) ship rods for testing, 4.) procure materials, fabricate, and construct apparatus for SCC testing, 5.) perform and monitor SCC testing, 6.) etc.	ABFJV + subs	EWFA	$ 6,800,000.00	$ 500,000.00		6/19/13
314 S1		Additional Funds CCO				$ 450,000.00		7/24/13
314 S2		Additional Funds CCO				$ 2,550,000.00		
	Subtotal				**$ 7,000,000**			
	Contingency (25%)				**$ 1,750,000**			
	Total Budget Request				**$ 8,750,000**			
	TBPOC Approved Expenditure (May 9th, 2013)					**$ 1,000,000.00**		

Anchor Rod Testing Program

SAS A354BD Bolt Tests

							Testing Plan - Sampling (minimum)				
ID	Priority	Structural Component	Number of Bolts	Nominal Bolt Diameter [in]	Sustained Bolt Tension % Fu (UTS)	Number of Heats	I *in-situ* test	II Laboratory test (Note 1)	III Full Size Tension + Lab	IV Stress Corrosion test	V Incremental Step Load (ISL) Technique
1	TBD	Shear Key Anchor Bolts- Bottom (S1/S2)	96	3	0.70	7	87 +/-	10	1 (Note 9)	1 (Note 9)	5
2	A	Shear Key Anchor Bolts- Bottom (S3/S4)	96	3	0.70	1*	90	-	2**	2	2 (from test III)
	A	Pier E2 Bearing Bolts- Bottom Housing (B1, B2, B3, B4)	96	3	0.70	1*	74	-	2**	2	2 (from test III)
3	A	Shear Key Anchor Bolts-Top (S1/S2)	160	3	0.70	1*	160	6 (spares)	2 (spares)	-	2 (spares)
	A	Shear Key Anchor Bolts-Top (S3/S4)	160	3	0.70	1*	160	6 (spares)	2 (spares)	-	2 (spares)
4	A	Pier E2 Bearing Bolts- Top Housing (B1,B2,B3,B4)	224	2	0.70	1	224	7 (spares)	2 (spares)	1 (spare)	2 (spares)
5	-	Spherical Bearing Bushing Assembly Bolts	96	1	0.61	1	-	-	-	-	
6	-	Bearing Retainer Ring Plate Assembly Bolts	336	1	0.40	2	-	-	-	-	
7	B	PWS Strand Anchor Rods (Main Cable)	274	3-1/2	0.32	17	270 (Note 2)	43	1 (spare)	4***	4
8	C	Tower Saddle Tie Rods	25	4	0.68	1	19 (Note 3)	2 (spare)	1 (spare)	1 (spare)	1 (spare)
9	D	Tower Saddle Turned Rods (@ Splices)	100	3	0.45	2	20	2	-	-	
	D	Tower Saddle Turned Rods (@ Splices)	8	3	0.10	1					
10	-	Tower Saddle Grillage Bolts	90	3	0.10	1	-	-	-	-	
11	D	Tower Outrigger	4	3	0.10	1	-	-	1 (spare)	-	
12	C	Tower Anchorage Anchor Bolts (75 Dia. Anchor Bolts)	388	3	0.48	2	194	6 (Note 5)	1 (Note 7)	1 (Note 7)	2 (Note 5)
13	C	Tower Anchorage Anchor Bolts (100 Dia. Anchor Bolts)	36	4	0.37	1	36	3 (Note 5)	-	-	1 (Note 5)
14	D	East Saddle Anchor Rods	32	2	0.10	1	16	2 (Notes 4 &7)	1 (spare)	-	
15	D	East Saddle Tie Rods	18	3	0.20	1	9	1	-	-	
16	D	Cable Bracket Anchor Rods	24	3	0.16	1	12	(Note 6)	-	-	
17	E	Bikepath Anchor Bolts at Pier W2	43	1-1/4	0.10	1	9	1	-	-	
18		E2 2013 Replacement Rods (CCO 312)	30	3	0.70		-	4	-	10 (Note 8)	4 (Note 8)

Notes: Notes:

1. Test at least one sample from each heat for Test II
2. Cut-off drill and tap hole @ end for testing. Sample lengths to be provided in separate attachment.
3. Test top surface of hex @ end of rod.
4. No Charpy tests due to limited available rod stick-out.
5. Samples for lab test shall be taken after tests I, III and IV are completed.
6. Same heat as PWS, no sampling necessary.
7. Sample already removed.
8. Rods to be tested shall be as follows
   + Galvanized: 3 Test IV
   + Black: 3 Test IV
   + Double Heat Treated, Galvanized: 2 Test IV
   + Double Heat Treated, Black: 2 Test IV
   + 1 rod Cut - half galv hafl black: Test V
   + 1 rod Double Heat Treated, half galv. Half black. Test V
9. If sample of sufficient length is available

*** 2 rolled thread samples &
2 cut thread samples

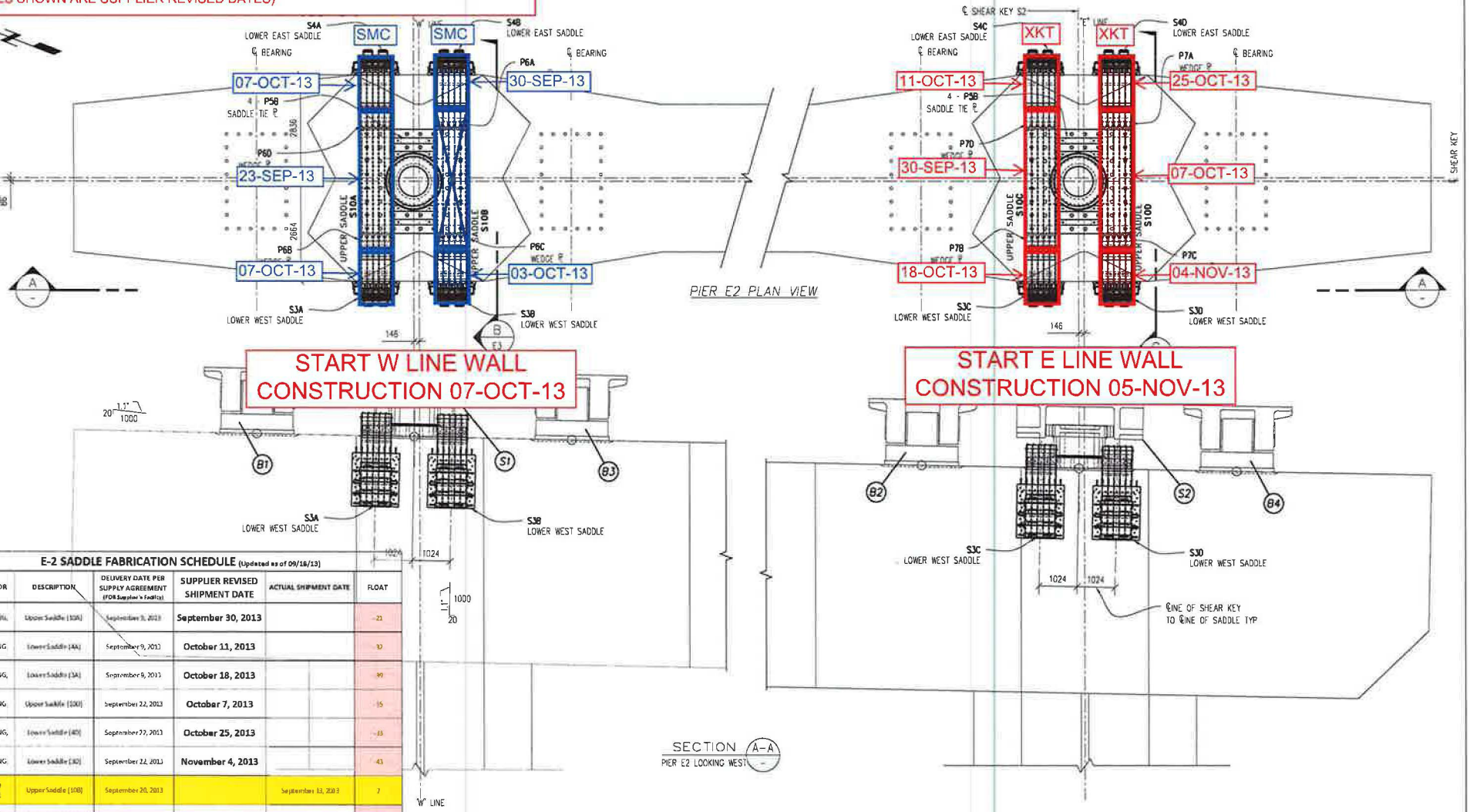
E2 Shear Key S1/S2 CCO Tracking Status

Updated 9/16/2013

CCO NO.	Description	Reference	Work Performed By	Method of Payment	Order of Magnitude (ongoing discussions with ABFJV)	CCO Net Dollar Amount (Adds & Credits)	Date of TBPOC Approval	Executed Date
Shear Key Anchorage Rod Replacment (Option C - Prestressed Post-Tensioned Concrete Steel Saddle Design)								
Field Work								
320	Temporary Bearing Shimming	Install steel shim plates between the temporary bearing foot and a temporary jacking lug welded to the temporary bearing base plate. (RFI 3242)	ABFJV	LS	$ 100,000.00	$ 100,000.00	7/10/13	
325	Concrete Demolition	Concrete removal for saddles, construction joint surface prep. (bush hammering), construction joint keyway chipping, drill and bond dowel, mock up at Pier 7	Conco	EWFA	$ 750,000.00	$ 750,000.00	7/10/13	
329	E2 Shear Key Concrete	Forming, placing, curing, thermal control and finishing concrete. Includes creep testing for 1 year.	Conco	EWFA	$ 1,300,000.00	$ 1,300,000.00	7/10/13	
326	Concrete Coring	Concrete coring , keyway saw cutting, water disposal , etc.	Penhall, Eco Bay, Rain For Rent	EWFA	$ 500,000.00	$ 500,000.00	7/10/13	
327	ABFJV Field Work	All ABFJV Field work and subcontractor support, incl.: - Mob. and demob. access/falsework/platforms, etc. - Field work and subcontractor support - Survey, testing, and QC - Install steel saddle (set, grout into place, etc.) - Final field paint and touch-up - Bevel and Machine Shear Keys Base - Produce Steel Shop Drawings - Traveller Rail and Safety Rail Modifications	ABFJV, Finnoe Design, IPM	EWFA	$ 4,940,000.00	$ 3,400,000.00	7/10/13	
327 S1		Additional Funds CCO				$ 1,540,000.00		
328	Bar Reinforcing Steel	Furnish and place rebar	Harris Salinas	EWFA	$ 1,000,000.00	$ 675,000.00	7/10/13	
		Additional Funds CCO				$ 325,000.00		
330	Post Tensioning	Furnish strand/anchors, install, stress, grout, etc	Schwager Davis	EWFA	$ 1,000,000.00	$ 1,000,000.00	7/10/13	
331	Pier E2 Plan Sheets	Plan sheets for all Pier E2 Work (Zero Cost CCO - Repository for Plan Sheets)			$ -	$ -	7/10/13	
333	Pier E2 CCO Credit	Pier E2 Shear Key S1/S2 Work Credit - See CSR #3		L.S.	$ -	$ -		
338	Bearing Shims	Furnish and Install steel shims at Bearings 1 - 4 in both long. and trans. directions.	Benecia, CCC, IPM, ABFJV	EWFA	$ 250,000.00	$ 250,000.00		
337	Temporary Rods	Furnish and Install Temporary Rods at E2 (8 total rods for shear keys 3 & 4, and bearings 1-4)	Dyson, ABFJV	EWFA	$ 160,000.00	$ 160,000.00		
	Subtotal				**$ 10,000,000.00**	**$ 10,000,000.00**		
Fabrication Work								
313	Shear Key Materials	Procuring the necessary long lead time materials for Pier E2 Shear Keys 1 & 2 steel saddle.	Leeco, XKT Evraz	EWFA	$ 1,500,000.00	$ 1,500,000.00	7/10/13	
319	E2 Shear Key Fabrication	Fabricate steel saddle	XKT/SMC	EWFA	$ 6,500,000.00	$ 5,000,000.00	7/10/13	
319 S1						$ 1,500,000.00		
	Subtotal				**$ 8,000,000.00**	**$ 8,000,000.00**		
	Subtotal (Field Work & Fabrication)				**$ 18,000,000.00**	**$ 18,000,000.00**		
	TBPOC Approved Expenditure (April 11th, May 9th, June 6th, July 10th, 2013)					**$ 18,000,000.00**		

E2 Schedule Update (09-18

E-2 SADDLE UPDATED DELIVERY DATES WITH MODIFIED ARRANGEMENT
(DATES SHOWN ARE SUPPLIER REVISED DATES)



E-2 SADDLE FABRICATION SCHEDULE (Updated as of 09/16/13)

FABRICATOR	DESCRIPTION	DELIVERY DATE PER SUPPLY AGREEMENT (FOB Supplier's Facility)	SUPPLIER REVISED SHIPMENT DATE	ACTUAL SHIPMENT DATE	FLOAT
XKT ENGINEERING, INC.	Upper Saddle (10A)	September 9, 2013	September 30, 2013		-21
XKT ENGINEERING, INC.	Lower Saddle (4A)	September 9, 2013	October 11, 2013		-32
XKT ENGINEERING, INC.	Lower Saddle (3A)	September 9, 2013	October 18, 2013		-39
XKT ENGINEERING, INC.	Upper Saddle (10D)	September 22, 2013	October 7, 2013		-15
XKT ENGINEERING, INC.	Lower Saddle (4D)	September 22, 2013	October 25, 2013		-43
XKT ENGINEERING, INC.	Lower Saddle (3D)	September 22, 2013	November 4, 2013		-43
STEWARD MACHINE	Upper Saddle (10B)	September 20, 2013		September 13, 2013	7
STEWARD MACHINE	Lower Saddle (4B)	September 20, 2013	September 30, 2013		10
STEWARD MACHINE	Lower Saddle (3B)	September 27, 2013	October 3, 2013		-6
STEWARD MACHINE	Upper Saddle (10C)	October 7, 2013	September 23, 2013		14
STEWARD MACHINE	Lower Saddle (3C)	October 4, 2013	October 7, 2013		-3
STEWARD MACHINE	Lower Saddle (4C)	October 7, 2013	October 7, 2013		0

NOTES:

REV	DESCRIPTION	BY	DATE
1	FOR CONSTRUCTION	BPF	07/12/13
2	FOR APPROVAL	BPF	08/14/13

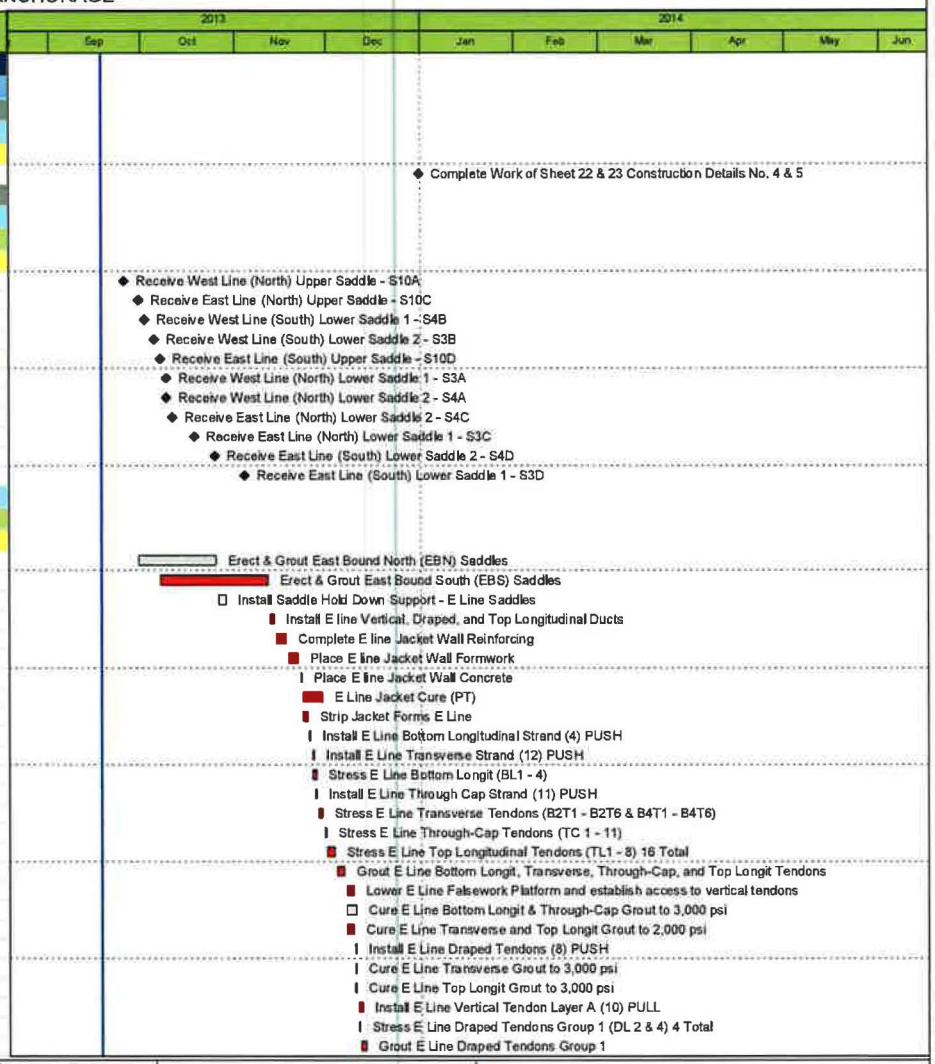
SEE GENERAL NOTES SHEET GN1
SEE GENERAL NOTES SHEET GN1
SEE GENERAL NOTES SHEET GN1

CONTRACTOR: American Bridge / FLUOR, A JOINT VENTURE
FACRICATOR:
BRIDGE NO. 34-0006L/R
ROUTE NO. INTERSTATE 80
KILOMETER NO. 13.2 - 13.9
JOB NAME: SAN FRANCISCO OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT EAST END SHEAR KEY HOLD DOWN
LOCATION: SAN FRANCISCO
CONTRACTOR: AMERICAN BRIDGE/FLUOR
DESCRIPTION: E2 SHEAR KEY ANCHORAGE ERECTION PLAN
DRAWN BY: BPF
CHECKED BY
REF. DWGS
DATE: 08/10/13
JOB NUMBER
SHEET
7861-E2
0

SUB-002859R04

E2 SHEAR KEY ANCHORAGE

Activity ID	Activity Description	OD	Start	Finish	RESP
E2 Shear Key Anchorage - Supplier Revised Shipment Dates		119	23-Aug-13 A	17-Feb-14	
MAIN		119	23-Aug-13 A	17-Feb-14	
Project General		0	31-Dec-13	31-Dec-13	
Construction		0	31-Dec-13	31-Dec-13	
Non-Directional		0	31-Dec-13	31-Dec-13	
PGCONHE0005	Complete Work of Sheet 22 & 23 Construction Details No. 4 & 5	0		31-Dec-13*	
E2 Crossbeam		119	23-Aug-13 A	17-Feb-14	
Fabrication		28	25-Sep-13	04-Nov-13	
Shear Key Anchorage		28	25-Sep-13	04-Nov-13	
No DIRECTION		28	25-Sep-13	04-Nov-13	
E2FABHE1510	Receive West Line (North) Upper Saddle - S10A	0		25-Sep-13*	SMC
E2FABHE1090	Receive East Line (North) Upper Saddle - S10C	0		30-Sep-13*	XKT
E2FABHE1560	Receive West Line (South) Lower Saddle 1 - S4B	0		02-Oct-13*	SMC
E2FABHE1610	Receive West Line (South) Lower Saddle 2 - S3B	0		05-Oct-13*	SMC
E2FABHE1140	Receive East Line (South) Upper Saddle - S10D	0		07-Oct-13*	XKT
E2FABHE1660	Receive West Line (North) Lower Saddle 1 - S3A	0		09-Oct-13*	SMC
E2FABHE1730	Receive West Line (North) Lower Saddle 2 - S4A	0		09-Oct-13*	SMC
E2FABHE1270	Receive East Line (North) Lower Saddle 2 - S4C	0		11-Oct-13*	XKT
E2FABHE1220	Receive East Line (North) Lower Saddle 1 - S3C	0		18-Oct-13*	XKT
E2FABHE1370	Receive East Line (South) Lower Saddle 2 - S4D	0		25-Oct-13*	XKT
E2FABHE1320	Receive East Line (South) Lower Saddle 1 - S3D	0		04-Nov-13*	XKT
Construction		119	23-Aug-13 A	17-Feb-14	
Shear Key Anchorage		119	23-Aug-13 A	17-Feb-14	
Eastbound		63	30-Sep-13	30-Dec-13	
E2CONHE0735	Erect & Grout East Bound North (EBN) Saddles	26	30-Sep-13	25-Oct-13	ABF
E2CONHE0475	Erect & Grout East Bound South (EBS) Saddles	36	07-Oct-13	11-Nov-13	ABF
E2CONHE3380	Install Saddle Hold Down Support - E Line Saddles	3	26-Oct-13	28-Oct-13	ABF
E2CONHE0755	Install E line Vertical, Draped, and Top Longitudinal Ducts	2	12-Nov-13	13-Nov-13	SDI
E2CONHE0765	Complete E line Jacket Wall Reinforcing	4	14-Nov-13	17-Nov-13	HSR
E2CONHE0775	Place E line Jacket Wall Formwork	4	18-Nov-13	21-Nov-13	CON
E2CONHE0785	Place E line Jacket Wall Concrete	1	22-Nov-13	22-Nov-13	CON
E2CONHE0805	E Line Jacket Cure (PT)	7	23-Nov-13	29-Nov-13	ABF
E2CONHE0605	Strip Jacket Forms E Line	2	23-Nov-13	24-Nov-13	CON
E2CONHE3150	Install E Line Bottom Longitudinal Strand (4) PUSH	1	25-Nov-13	25-Nov-13	SDI
E2CONHE3160	Install E Line Transverse Strand (12) PUSH	1	26-Nov-13	26-Nov-13	SDI
E2CONHE3180	Stress E Line Bottom Longit (BL1 - 4)	2	26-Nov-13	27-Nov-13	SDI
E2CONHE3170	Install E Line Through Cap Strand (11) PUSH	1	27-Nov-13	27-Nov-13	SDI
E2CONHE3190	Stress E Line Transverse Tendons (B2T1 - B2T6 & B4T1 - B4T6)	2	28-Nov-13	29-Nov-13	SDI
E2CONHE3210	Stress E Line Through-Cap Tendons (TC 1 - 11)	1	30-Nov-13	30-Nov-13	SDI
E2CONHE3230	Stress E Line Top Longitudinal Tendons (TL1 - 8) 16 Total	3	01-Dec-13	03-Dec-13	SDI
E2CONHE3240	Grout E Line Bottom Longit, Transverse, Through-Cap, and Top Longit Tend...	3	04-Dec-13	06-Dec-13	SDI
E2CONHE3220	Lower E Line Falsework Platform and establish access to vertical tendons	3	07-Dec-13	09-Dec-13	SDI
E2CONHE3350	Cure E Line Bottom Longit & Through-Cap Grout to 3,000 psi	4	07-Dec-13	10-Dec-13	SDI
E2CONHE3351	Cure E Line Transverse and Top Longit Grout to 2,000 psi	3	07-Dec-13	09-Dec-13	SDI
E2CONHE3250	Install E Line Draped Tendons (8) PUSH	1	10-Dec-13	10-Dec-13	SDI
E2CONHE3352	Cure E Line Transverse Grout to 3,000 psi	1	10-Dec-13	10-Dec-13	SDI
E2CONHE3353	Cure E Line Top Longit Grout to 3,000 psi	1	10-Dec-13	10-Dec-13	SDI
E2CONHE3260	Install E Line Vertical Tendon Layer A (10) PULL	2	11-Dec-13	12-Dec-13	SDI
E2CONHE3270	Stress E Line Draped Tendons Group 1 (DL 2 & 4) 4 Total	1	11-Dec-13	11-Dec-13	SDI
E2CONHE3300	Grout E Line Draped Tendons Group 1	2	12-Dec-13	13-Dec-13	SDI



American Bridge / FLUOR
A JOINT VENTURE

DRAFT

American Bridge / Fluor, A Joint Venture

SFOBB Self Anchored Suspension Bridge

Shear Key Anchorage

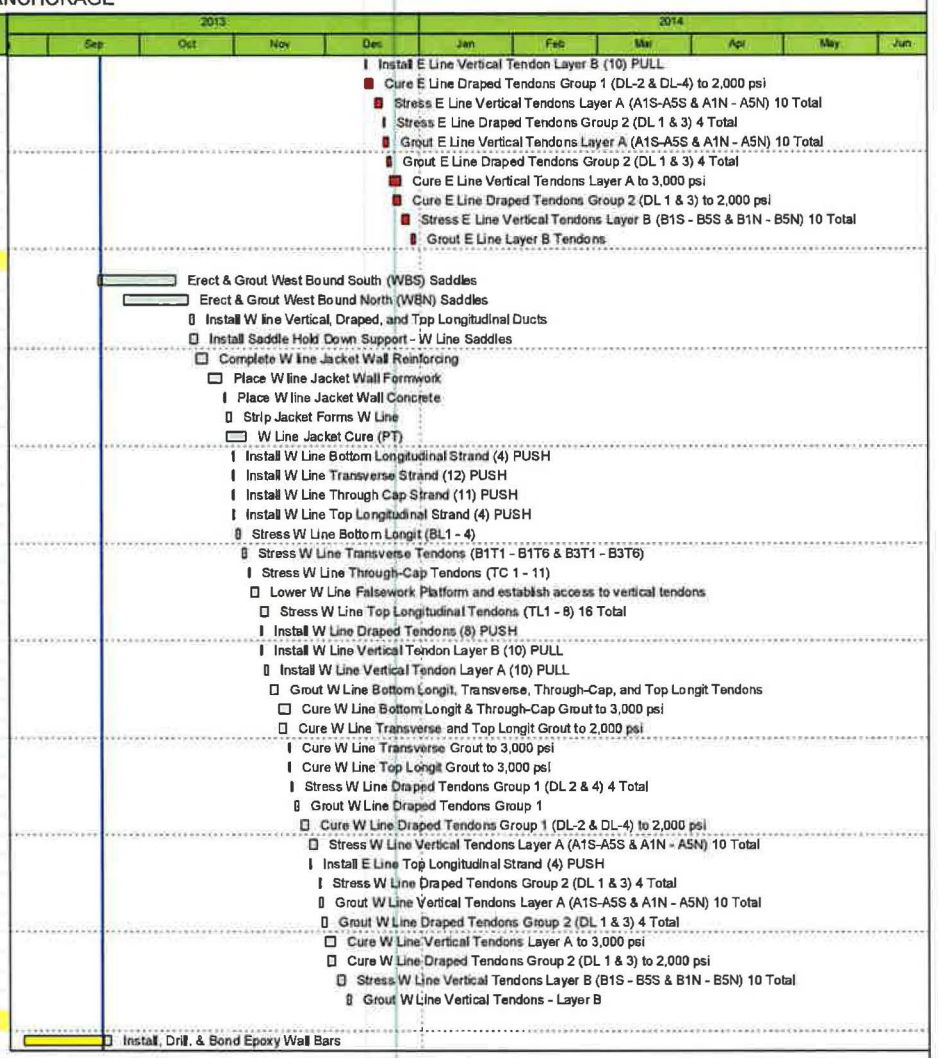
Run Date: 18-Sep-13 08:52

Data Date: 18-Sep-13

Remaining Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

E2 SHEAR KEY ANCHORAGE

Activity ID	Activity Description	OD	Start	Finish	RESP
E2CONHE3310	Install E Line Vertical Tendon Layer B (10) PULL	1	14-Dec-13	14-Dec-13	SDI
E2CONHE3151	Cure E Line Draped Tendons Group 1 (DL-2 & DL-4) to 2,000 psi	3	14-Dec-13	16-Dec-13	SDI
E2CONHE3280	Stress E Line Vertical Tendons Layer A (A1S-A5S & A1N - A5N) 10 Total	3	17-Dec-13	19-Dec-13	SDI
E2CONHE3290	Stress E Line Draped Tendons Group 2 (DL 1 & 3) 4 Total	1	20-Dec-13	20-Dec-13	SDI
E2CONHE3121	Grout E Line Vertical Tendons Layer A (A1S-A5S & A1N - A5N) 10 Total	2	20-Dec-13	21-Dec-13	SDI
E2CONHE3141	Grout E Line Draped Tendons Group 2 (DL 1 & 3) 4 Total	2	21-Dec-13	22-Dec-13	SDI
E2CONHE3112	Cure E Line Vertical Tendons Layer A to 3,000 psi	4	22-Dec-13	25-Dec-13	SDI
E2CONHE3122	Cure E Line Draped Tendons Group 2 (DL 1 & 3) to 2,000 psi	3	23-Dec-13	25-Dec-13	SDI
E2CONHE3320	Stress E Line Vertical Tendons Layer B (B1S - B5S & B1N - B5N) 10 Total	3	26-Dec-13	28-Dec-13	SDI
E2CONHE3330	Grout E Line Layer B Tendons	2	29-Dec-13	30-Dec-13	SDI
Westbound		57	17-Sep-13 A	08-Dec-13	
E2CONHE0465	Erect & Grout West Bound South (WBS) Saddles	26	17-Sep-13 A	12-Oct-13	ABF
E2CONHE0725	Erect & Grout West Bound North (WBN) Saddles	22	25-Sep-13	16-Oct-13	ABF
E2CONHE0485	Install W line Vertical, Draped, and Top Longitudinal Ducts	2	17-Oct-13	18-Oct-13	SDI
E2CONHE3360	Install Saddle Hold Down Support - W Line Saddles	3	17-Oct-13	19-Oct-13	SDI
E2CONHE0495	Complete W line Jacket Wall Reinforcing	4	19-Oct-13	22-Oct-13	HSR
E2CONHE0505	Place W line Jacket Wall Formwork	5	23-Oct-13	27-Oct-13	CON
E2CONHE0515	Place W line Jacket Wall Concrete	1	28-Oct-13	28-Oct-13	CON
E2CONHE0525	Strip Jacket Forms W Line	2	29-Oct-13	30-Oct-13	CON
E2CONHE0535	W Line Jacket Cure (PT)	7	29-Oct-13	04-Nov-13	ABF
E2CONHE0545	Install W Line Bottom Longitudinal Strand (4) PUSH	1	31-Oct-13	31-Oct-13	SDI
E2CONHE0555	Install W Line Transverse Strand (12) PUSH	1	31-Oct-13	31-Oct-13	SDI
E2CONHE0565	Install W Line Through Cap Strand (11) PUSH	1	31-Oct-13	31-Oct-13	SDI
E2CONHE0595	Install W Line Top Longitudinal Strand (4) PUSH	1	31-Oct-13	31-Oct-13	SDI
E2CONHE0575	Stress W Line Bottom Longit (BL1 - 4)	2	01-Nov-13	02-Nov-13	SDI
E2CONHE3000	Stress W Line Transverse Tendons (B1T1 - B1T6 & B3T1 - B3T6)	2	03-Nov-13	04-Nov-13	SDI
E2CONHE3020	Stress W Line Through-Cap Tendons (TC 1 - 11)	1	05-Nov-13	05-Nov-13	SDI
E2CONHE3030	Lower W Line Falsework Platform and establish access to vertical tendons	3	06-Nov-13	08-Nov-13	SDI
E2CONHE3040	Stress W Line Top Longitudinal Tendons (TL1 - 8) 16 Total	3	09-Nov-13	11-Nov-13	SDI
E2CONHE3060	Install W Line Draped Tendons (8) PUSH	1	09-Nov-13	09-Nov-13	SDI
E2CONHE3120	Install W Line Vertical Tendon Layer B (10) PULL	1	09-Nov-13	09-Nov-13	SDI
E2CONHE3070	Install W Line Vertical Tendon Layer A (10) PULL	2	10-Nov-13	11-Nov-13	SDI
E2CONHE3050	Grout W Line Bottom Longit, Transverse, Through-Cap, and Top Longit Tend...	3	12-Nov-13	14-Nov-13	SDI
E2CONHE3340	Cure W Line Bottom Longit & Through-Cap Grout to 3,000 psi	4	15-Nov-13	18-Nov-13	SDI
E2CONHE3341	Cure W Line Transverse and Top Longit Grout to 2,000 psi	3	15-Nov-13	17-Nov-13	SDI
E2CONHE3342	Cure W Line Transverse Grout to 3,000 psi	1	18-Nov-13	18-Nov-13	SDI
E2CONHE3343	Cure W Line Top Longit Grout to 3,000 psi	1	18-Nov-13	18-Nov-13	SDI
E2CONHE3080	Stress W Line Draped Tendons Group 1 (DL 2 & 4) 4 Total	1	19-Nov-13	19-Nov-13	SDI
E2CONHE3110	Grout W Line Draped Tendons Group 1	2	20-Nov-13	21-Nov-13	SDI
E2CONHE3111	Cure W Line Draped Tendons Group 1 (DL-2 & DL-4) to 2,000 psi	3	22-Nov-13	24-Nov-13	SDI
E2CONHE3090	Stress W Line Vertical Tendons Layer A (A1S-A5S & A1N - A5N) 10 Total	3	25-Nov-13	27-Nov-13	SDI
E2CONHE0615	Install E Line Top Longitudinal Strand (4) PUSH	1	25-Nov-13	25-Nov-13	SDI
E2CONHE3100	Stress W Line Draped Tendons Group 2 (DL 1 & 3) 4 Total	1	26-Nov-13	26-Nov-13	SDI
E2CONHE3091	Grout W Line Vertical Tendons Layer A (A1S-A5S & A1N - A5N) 10 Total	2	26-Nov-13	29-Nov-13	SDI
E2CONHE3101	Grout W Line Draped Tendons Group 2 (DL 1 & 3) 4 Total	2	29-Nov-13	30-Nov-13	SDI
E2CONHE3092	Cure W Line Vertical Tendons Layer A to 3,000 psi	4	30-Nov-13	03-Dec-13	SDI
E2CONHE3102	Cure W Line Draped Tendons Group 2 (DL 1 & 3) to 2,000 psi	3	01-Dec-13	03-Dec-13	SDI
E2CONHE3130	Stress W Line Vertical Tendons Layer B (B1S - B5S & B1N - B5N) 10 Total	3	04-Dec-13	06-Dec-13	SDI
E2CONHE3140	Grout W Line Vertical Tendons - Layer B	2	07-Dec-13	08-Dec-13	SDI
Non-Directional		119	23-Aug-13 A	17-Feb-14	
E2CONHH0110	Install, Drill, & Bond Epoxy Wall Bars	62	23-Aug-13 A	20-Sep-13	CON



American Bridge / FLUOR
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American Bridge / Fluor, A Joint Venture

SFOBB Self Anchored Suspension Bridge

Shear Key Anchorage

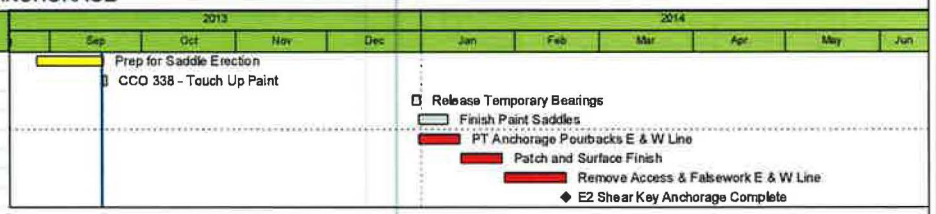
Run Date: 18-Sep-13 08:53

Data Date: 18-Sep-13

Remaining Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

E2 SHEAR KEY ANCHORAGE

Activity ID	Activity Description	OD	Start	Finish	RESP
E2CONHH0100	Prep for Saddle Erection	14	27-Aug-13 A	18-Sep-13	ABF
E2CONHH0085	CCO 338 - Touch Up Paint	2	18-Sep-13*	19-Sep-13	CCC
E2CONHE3131	Release Temporary Bearings	3	29-Dec-13	31-Dec-13	SDI
E2CONHE0685	Finish Paint Saddles	10	31-Dec-13	09-Jan-14	CCC
E2CONHE0825	PT Anchorage Pourbacks E & W Line	14	31-Dec-13	13-Jan-14	CON
E2CONHE0695	Patch and Surface Finish	14	14-Jan-14	27-Jan-14	CON
E2CONHE0835	Remove Access & Falsework E & W Line	21	28-Jan-14	17-Feb-14	ABF
E2CONHG0015	E2 Shear Key Anchorage Complete	0		17-Feb-14	



American Bridge / FLUOR
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American Bridge / Fluor, A Joint Venture

SFOBB Self Anchored Suspension Bridge

Shear Key Anchorage

Run Date: 18-Sep-13 08:53

Data Date: 18-Sep-13

Remaining Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE
CALTRANS · BAY AREA TOLL AUTHORITY · CALIFORNIA TRANSPORTATION COMMISSION

Memorandum

TO: Toll Bridge Program Oversight Committee (TBPOC) **DATE:** September 30, 2013

FR: Tony Anziano, Toll Bridge Program Manager, Caltrans

RE: Agenda No. - 3a2

Item- San Francisco-Oakland Bay Bridge Updates
E2 Update – Anchor Rod Testing Program CCOs
Self-Anchored Suspension Span Anchor Rod Testing Program Change Order Nos. 312, 314, 314 S1, and 314 S2.

Recommendation:
APPROVAL

Cost:

CCO 312:	$200,000	Anchor Rod Replacements
CCO 314:	$500,000	Anchor Rod Testing
CCO 314 S1:	$450,000	Anchor Rod Testing (additional funds)
CCO 314 S2:	$2,550,000	Anchor Rod Testing (additional funds)
Total:	$3,700,000	

Schedule Impacts:
See separate TBPOC memo addressing the ASTM A354 Grade BD anchor rod testing budget authorization request for schedule discussion.

Discussion:
Contract Change Order (CCO) No.'s 312, 314, 314 S1, and 314 S2 provide for the anchor rod testing efforts for the ASTM A354 Grade BD anchor rods as follows:

- CCO 312 procures ASTM A354 Grade BD anchor rods with supplementary requirements for the testing program as well as for the 8 replacement rods required at Pier E2, and
- CCO 314 S0, S1, & S2 provide for the testing of the ASTM A354 Grade BD anchor rods.

The cumulative total of these CCO's is $3,700,000. However, CCO's 314 S0 & S1 were previously executed for a total of $950,000, within the TBPOC budgetary approval of $1,000,000 provided on May 9, 2013.

A separate TBPOC memo provides for an overall ASTM A354 Grade BD anchor rod testing budget authorization request.

Risk Management:

The SAS risk register carries a risk for the testing of ASTM A354 Grade BD Rods in the range of $2.05M to $25M to address testing and remedial actions as necessary. The cost of this change is within the range contemplated for this risk. This change is only a portion of the potential changes addressed by this risk.

Any schedule impacts to contract completion related to this issue is covered under a separate risk - "Schedule: Potential delay during construction - Post Seismic Safety Opening (SSO)". This risk carries a range of $22M to $44M and is intended to address delays to contract completion for several risk issues and not necessarily this risk alone.

Attachment(s):

1. Draft CCO: 312, 314 S0, 314 S1, and 314 S2
2. Draft CCO Memo: 312, 314 S0, 314 S1, and 314 S2

CONTRACT CHANGE ORDER

Change Requested by: Engineer

CCO: 312 Suppl. No. 0 Contract No. 04 – 0120F4 Road SF-80-13.2/13.9 **FED. AID LOC.:**

To: **AMERICAN BRIDGE/FLUOR ENTERPRISES INC A JOINT VENTURE**

You are directed to make the following changes from the plans and specifications or do the following described work not included in the plans and specifications for this contract. ***NOTE: This change order is not effective until approved by the Engineer.***

Description of work to be done, estimate of quantities and prices to be paid. (Segre…orce account.) Unless otherwise stated, rates for rental of equipment cover only such time as equip… This last percentage shown is the net accumulated increase or decrease from the original qu…

DRAFT

Extra Work at Force Account:

Furnish forty (40) ASTM A354 Grade BD anchor bolt assemblies in accordance with the requirements of Section 10-1.47, "SPHERICAL BUSHING BEARING (PIER E2)" and Section 10-1.50, "SHEAR KEY (PIER E2)" in the Special Provisions for testing and replacement rods in the Pier E2 Shear Keys and Bearings. In addition, the rods shall meet the following supplementary requirements:

- The steel shall have Rockwell hardness limited to 31 HRC minimum and 35 HRC maximum. These measurements shall be taken at 3 mm increments from the ends and at 3 mm increments across the entire cross section of the heat treated rods.
- Hardness measurements shall be in two traverses at 90 degrees to each other and shall be taken at a minimum of one rod diameter from the end of the heat treated rods.
- The steel shall have a minimum Charpy V impact resistance of 50 ft-lb at +40 Degrees F.
- The rods shall be MT inspected after threading and before galvanizing. The MT inspection shall include both the unthreaded shank and the threaded ends. The MT inspection shall be on 100% of the rods, with ASTM F788 used for the acceptance criteria.

Labor, equipment and material authorized by the Engineer, as necessary, will be paid in accordance with the provisions of Section 4-1.03D, "Extra Work" of the Standard Specifications and Section 5-1.24, "Force Account Payment" of the Special Provisions.

Estimated Cost of Extra Work at Force Account $200,000.00

Estimated Cost: Increase ☒ Decrease ☐ $200,000.00

By reason of this order the time of completion will be adjusted as follows: 0 Days

Submitted by

Signature	**Resident Engineer** Darryl Schram, Senior T.E.	**Date**

Approval Recommended by

Signature	**Supervising Transportation Engineer** William Casey, Supervising T.E.	**Date**

Engineer Approval by

Signature	**Supervising Transportation Engineer** William Casey, Supervising T.E.	**Date**

We the undersigned contractor, have given careful consideration to the change proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

NOTE: If you, the contractor, do not sign acceptance of this order, your attention is directed to the requirements of the specifications as to proceeding with the ordered work and filing a written protest within the time therein specified.

Contractor Acceptance by

Signature	(Print name and title)	**Date**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CONTRACT CHANGE ORDER MEMORANDUM

DC-CEM-4903 (OLD HC-39 REV. 6/93) CT# 7541-3544-0

DATE: September 12, 2013

TO: Tony Anziano, Project Manager			FILE: **04-0120F4** 04-SF-80-13.2, 13.9
FROM: Darryl Schram, Senior T.E.			
CCO NO. **312**	SUPPLEMENT NO. **0**	CATEGORY CODE	CONTINGENCY BALANCE (including this change)
$200,000.00 INCREASE ☒ DECREASE ☐			HEADQUARTERS APPROVAL REQUIRED? YES ☒ NO ☐
SUPPLEMENTAL FUNDS PROVIDED: CCO Description: Pier E2 Additional Rods			IS THIS REQUEST IN ACCORDANCE WITH ENVIRONMENTAL COMMITMENTS? YES ☒ NO ☐

DRAFT

THIS CHANGE ORDER PROVIDES FOR:

Furnishing forty (40) ASTM A354 Grade BD anchor bolt assemblies in accordance with the requirements of Section 10-1.47, "SPHERICAL BUSHING BEARING (PIER E2)" and Section 10-1.50, "SHEAR KEY (PIER E2)" in the Special Provisions and supplementary requirements for hardness, Charpy V impact resistance, and MT inspection for testing and replacement rods in the Pier E2 shear keys and bearings.

Contract Plan Sheets 884R1 "Pier E2 Bearing Details No. 2" and 887R2 "Pier E2 Shear Key Details No. 1" identify the anchor bolts for the Pier E2 Shear Keys and Bearings as 76 mm A354 Grade BD Bolts. These plan sheets require the bolts to be tensioned to 0.70 Fu (70% of their ultimate strength). Special Provisions Sections 10-1.47 "Spherical Bushing Bearing (Pier E2)" and 10-1.50 "Shear Key (Pier E2)" provide the specification requirements for the anchor bolts. Both of these specifications refer you to Special Provisions Section 10-1.59 "Steel Structures" which in turn refers you to various ASTM specifications including ASTMs A123, A153, A143, A354, etc. which provide further specifications for the manufacture and testing of the anchor bolts and hardware. While these references provide for the final mechanical properties and processes for the manufacture of the bolts, they do not specifically require hydrogen embrittlement testing for the anchor bolts.

Within days after tensioning was performed, the anchor bolts in the shear keys directly below the Eastbound and Westbound Orthotropic Box Girder (OBG) structures (known as Shear Keys S1 and S2) began to fail. A total of 32 out of the 96 anchor bolts broke before the Department directed the Contractor to reduce the anchor bolt tension to prevent further failures. A forensic metallurgic examination was jointly performed with both the Contractor's and Materials Engineering and Testing Services' (METS) metallurgical experts. It was determined that while the failed bolts' material properties did meet the contract specifications, the hardness properties were at the upper limit and the ductility and toughness properties were at the lower limit. Taking this high end hardness and low end ductility into account and combining it with a high tensile stress (0.70 Fu) makes this material more susceptible to the effects of hydrogen cracking (also known as hydrogen embrittlement). The metallurgical examination indicated that the bolts were susceptible to hydrogen embrittlement due to a lack of uniformity in the microstructure of the rods.

The anchor bolts at Shear Keys S1 and S2 are uniquely different from the anchor bolts at the remaining shear keys and bearings (known as Shear Keys S3 and S4 and Bearings B1, B2, B3, and B4) in that they were manufactured in 2008 as opposed to the remaining ones in 2010. In addition, due to physical limitations the anchor bolts at Shear Keys S1 and S2 have their anchors fully cast into the Pier E2 cap and are not replaceable, as opposed to the remaining shear keys and bearings which are thru bolted and thus replaceable. As such, Shear Keys S1 and S2 will require an alternate anchorage solution.

Multiple change orders will be issued for the alternate shear key solution including:

- CCO 312 furnish replacements for rods removed for testing,
- CCO 313 procure long lead time materials,
- CCO 314 perform work to remove, replace and test sample rods,
- CCO 319 fabricate saddles,
- CCO 320 shim temporary bearings,
- CCO 325 perform concrete and rebar demolition,
- CCO 326 core drill for through-cap tendons,
- CCO 327 install temporary work platforms, falsework, and saddles,
- CCO 328 furnish and install reinforcing bars,
- CCO 329 place shear key concrete,

- CCO 330 furnish and install post tensioning, and
- CCO 331 plan sheets
- CCO 337 furnish, install, and remove temporary rods
- CCO 338 shim permanent bearings

This change order (CCO 312) will furnish 8 rods to replace rods removed in the Pier E2 shear keys and bearings and 32 rods to be used for additional testing.

The total cost of this change order is $200,000.00 force account, which can be financed from the contingency fund. A detailed cost analysis is on file.

No time adjustment is warranted as this change order does not affect the controlling operation.

The Toll Bridge Project Oversight Committee (TBPOC) initially (April 11, 2013) approved $4.3 million to continue work on the Shear Key S1 & S2 anchor rod replacement strategy solutions and to procure long lead time materials. The TBPOC revised this approval (May 9, 2013) to include all E2 shear key anchorage work within the approved $4.3 million funding. At the June 6, 2013 TBPOC meeting the TBPOC revised this approval to $7.5 million. At the July 10, 2013 TBPOC meeting the TBPOC further revised this approval to $18 million. CCO's 313, 319, 320, 325, 326, 327, 328, 329, 330, 337, and 338 are specific to this approval.

In addition, at the May 9th meeting the TBPOC also approved $1 million for the anchor rods test program. CCO's 312 and 314 are specific to this approval. TBPOC approval for an additional $2,725,000 for CCOs 312 and 314 is pending.

The SAS risk register is carrying the risk "Fabrication and Installation of a bracket to secure shear keys to Pier E2" in the range of $8M to $15M for the work related to fabricating and installing a retrofit to act in the place of the A354 Grade BD rods manufactured in 2008. The SAS risk register is also carrying the risk - "B/D Rods at the Bearings of Pier E2 & Misc Locations (2010)" in the range of $500K to $6.5M to test the remaining A354 Grade BD rods.

This change order has concurrence from William Casey (Supervising TE), Rich Foley (HQ Oversight), Wenyi Long (Bridge Design), Ken Brown (Maintenance), and Jing Chen (District Design).

CONCURRED BY:		**ESTIMATE OF COST**	
STRUCTURE REPRESENTATIVE	DATE	THIS REQUEST	TOTAL TO DATE
SR. BRIDGE ENGINEER	DATE	ITEMS	
		FORCE ACCOUNT	
FHWA REPRESENTATIVE	DATE	AGREED PRICE	
		ADJUSTMENT	
PROJECT ENGINEER			
OTHER (SPECIFIY)		**FEDERAL PARTICIPATION**	
		☐ PARTICIPATING ☐ PARTICIPATING IN PART ☒ NONE	
		☐ PARTICIPATING (MAINTENANCE) ☐ NON-PARTICIPATING	
	DATE	FEDERAL SEGREGATION (IF MORE THAN ONE FUNDING SOURCE OR P.I.P. TYPE)	
		☐ CCO FUNDED PER CONTRACT ☐ CCO FUNDED AS FOLLOWS	
DISTRICT PRIOR APPROVAL BY	DATE	FEDERAL FUNDING SOURCE	PERCENT
HQ (ISSUE & APPROVE) (TO PROCEED) BY	DATE		
RESIDENT ENGINEER SIGNATURE	DATE		

This part updated by CadB

HC-39 Word(Rev.9/96)

CONTRACT CHANGE ORDER

Change Requested by: Engineer

CCO: 314 Suppl. No. 0 Contract No. 04 – 0120F4 Road SF-80-13.2/13.9 **FED. AID LOC.:**

To: **AMERICAN BRIDGE/FLUOR ENTERPRISES INC A JOINT VENTURE**

You are directed to make the following changes from the plans and specifications or do the following described work not included in the plans and specifications for this contract. ***NOTE: This change order is not effective until approved by the Engineer.***

Description of work to be done, estimate of quantities and prices to be paid. (Segregate between additional work at contract price, agreed price and force account.) Unless otherwise stated, rates for rental of equipment cover only such time as equipment is actually used and no allowance will be made for idle time. This last percentage shown is the net accumulated increase or decrease from the original quantity in the Engineer's Estimate.

Extra Work at Force Account:

Perform additional sampling and testing of A354 Grade BD rods including, but not limited to, the following or as directed by the Engineer:

Item 1.

- Remove rods for additional testing, as directed by the Engineer.
- Additional testing to be performed by the Contractor shall be at the Engineer's direction.
- After testing the rods will then be turned over to the Department for further testing and examination.

Item 2.

- Remove galvanizing from the ends the rods for insitu hardness testing, as directed by the Engineer.
- After the Department has performed hardness testing, replace the galvanizing that was removed with inorganic zinc primer in accordance with Special Provisions Section 10-1.69 "Clean and Paint Structural Steel." Finish paint is not required.

Item 3.

- Construct apparatus and perform accelerated slow strain corrosion test, as directed by the Engineer.

The Department will provide written direction to the Contractor for all rods removed from the work and all testing to be performed by the Contractor.

The following revised plan sheets detail the changes addressed in this change order: 888S1, 888S2, 888S3, 888S4, 888S5, 888S6, 888S7, and 888S8 (of 1204) as shown on sheets 3 through 10 of this change order.

Labor, equipment and material authorized by the Engineer, as necessary, will be paid in accordance with the provisions of Section 4-1.03D, "Extra Work" of the Standard Specifications and Section 5-1.24, "Force Account Payment" of the Special Provisions.

Estimated Cost of Extra Work at Force Account $500,000.00

CONTRACT CHANGE ORDER

Change Requested by: Engineer

CCO: 314 **Suppl. No.** 0 **Contract No.** 04 – 0120F4 **Road** SF-80-13.2/13.9 **FED. AID LOC.:**

The work referenced in this Contract Change Order (CCO) is not required for Seismic Safety Opening (SSO). Should effects resulting from the performance of this work, after achieving readiness for SSO and opening to public traffic, have an impact on the work performed additional warranted compensation will be provided in accordance with Standard Specifications Section 4-1.03, "Changes," under a separate CCO.

Estimated Cost: **Increase** ☒ **Decrease** ☐ **$500,000.00**

By reason of this order the time of completion will be adjusted as follows: 0 Days

Submitted by

Signature	**Resident Engineer**		**Date**
For	Darryl Schram, Senior T.E.		6-13-13

Approval Recommended by

Signature	**Supervising Transportation Engineer**		**Date**
	William Casey, Supervising T.E.		6-13-13

Engineer Approval by

Signature	**Supervising Transportation Engineer**		**Date**
	William Casey, Supervising T.E.		6-19-13

We the undersigned contractor, have given careful consideration to the change proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

NOTE: If you, the contractor, do not sign acceptance of this order, your attention is directed to the requirements of the specifications as to proceeding with the ordered work and filing a written protest within the time therein specified.

Contractor Acceptance by

Signature	(Print name and title)	**Date**
	BRIAN A. PETERSEN - PROJECT DIRECTOR	15 JUN 13

History Copy

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CONTRACT CHANGE ORDER MEMORANDUM

TO: Tony Anziano, Program Manager /	FILE: **E.A.** 04 - 0120F4
	CO-RTE-PM SF-80-13.2/13.9
FROM: Darryl Schram, Senior TE	**FED. NO.** No
CCO#: **314** SUPPLEMENT#: **0** Category Code: **CHXX**	CONTINGENCY BALANCE (incl. this change) **$80,071,958.22**
COST: **$500,000.00** INCREASE ☑ DECREASE ☐	HEADQUARTERS APPROVAL REQUIRED? ☑ YES ☐ NO
SUPPLEMENTAL FUNDS PROVIDED: **$0.00**	IS THIS REQUEST IN ACCORDANCE WITH ENVIRONMENTAL DOCUMENTS? ☑ YES ☐ NO
CCO DESCRIPTION: Pier E2 Rod Testing	**PROJECT DESCRIPTION:** CONSTRUCT SELF-ANCHORED SUSPENSION BRIDGE

Original Contract Time:	Time Adj. This Change:	Previously Approved CCO Time Adjustments:	Percentage Time Adjusted: (including this change)	Total # of Unreconciled Deferred Time CCO(s): (including this change)
2490 Day(s)	**0** Day(s)	**501** Day(s)	**20** %	**3**

THIS CHANGE ORDER PROVIDES FOR:

Perform additional sampling and testing of rods including:

• Removing rods and performing additional testing. After testing the rods will then be turned over to the Department for further testing and examination.

• Removing galvanizing from the ends of the rods for insitu hardness testing. After the Department has performed hardness testing, replacing the galvanizing that was removed with inorganic zinc primer.

• Constructing apparatus and performing accelerated slow strain corrosion test.

Contract Plan Sheets 884R1 "Pier E2 Bearing Details No. 2" and 887R2 "Pier E2 Shear Key Details No. 1" identify the anchor bolts for the Pier E2 Shear Keys and Bearings as 76 mm A354 Grade BD Bolts. These plan sheets require the bolts to be tensioned to 0.70 Fu (70% of their ultimate strength). Special Provisions Sections 10-1.47 "Spherical Bushing Bearing (Pier E2)" and 10-1.50 "Shear Key (Pier E2)" provide the specification requirements for the anchor bolts. Both of these specifications refer you to Special Provisions Section 10-1.59 "Steel Structures" which in turn refers you to various ASTM specifications including ASTMs A123, A153, A143, A354, etc. which provide further specifications for the manufacture and testing of the anchor bolts and hardware. While these references provide for the final mechanical properties and processes for the manufacture of the bolts, they do not specifically require hydrogen embrittlement testing for the anchor bolts.

Within days after tensioning was performed, the anchor bolts in the shear keys directly below the Eastbound and Westbound Orthotropic Box Girder (OBG) structures (known as Shear Keys S1 and S2) began to fail. A total of 32 out of the 96 anchor bolts broke before the Department directed the Contractor to reduce the anchor bolt tension to prevent further failures. A forensic metallurgic examination was jointly performed with both the Contractor's and Materials Engineering and Testing Services' (METS) metallurgical experts. It was determined that while the failed bolts' material properties did meet the contract specifications, the hardness properties were at the upper limit and the ductility and toughness properties were at the lower limit. Taking this high end hardness and low end ductility into account and combining it with a high tensile stress (0.70 Fu) makes this material more susceptible to the effects of hydrogen cracking (also known as hydrogen embrittlement). The metallurgical examination indicated that the bolts were susceptible to hydrogen embrittlement due to a lack of uniformity in the microstructure of the rods.

The anchor bolts at Shear Keys S1 and S2 are uniquely different from the anchor bolts at the remaining shear keys and bearings (known as Shear Keys S3 and S4 and Bearings B1, B2, B3, and B4) in that they were manufactured in 2008 as opposed to the remaining ones in 2010. In addition, due to physical limitations the anchor bolts at Shear Keys S1 and S2 have their anchors fully cast into the Pier E2 cap and are not replaceable, as opposed to the remaining shear keys and bearings which are thru bolted and thus replaceable. As such, Shear Keys S1 and S2 will require an alternate anchorage solution.

Multiple change orders will be issued for the alternate shear key solution including:

- CCO 312 furnish replacements for rods removed for testing,
- CCO 313 procure long lead time materials,
- CCO 314 perform work to remove, replace and test sample rods,
- CCO 319 fabricate saddles,

- CCO 320 shim temporary bearings,
- CCO 325 perform concrete and rebar demolition,
- CCO 326 core drill for through-cap tendons,
- CCO 327 install temporary work platforms, falsework, and saddles,
- CCO 328 furnish and install reinforcing bars,
- CCO 329 place shear key concrete,
- CCO 330 furnish and install post tensioning, and
- CCO 331 plan sheets

This change order (CCO 314) will remove rods for additional testing. Once removed, testing will be performed on the rods to verify their material properties and suitability for the project.

Also, galvanizing will be removed from the ends of the rods so the Department can perform insitu hardness testing to verify material properties. After the Department has performed hardness tests, primer will be applied to repair the areas of lost galvanization.

Corrosion testing will be performed on rods to determine the susceptibility of the material to long term Stress Corrosion Cracking (SCC).

The total cost of this change order is $500,000.00 force account, which can be financed from the contingency fund. A detailed cost analysis is on file.

No time adjustment is warranted as this change order does not affect the controlling operation.

This change order has concurrence from William Casey (Supervising TE), Rich Foley (HQ Oversight), Wenyi Long (Bridge Design), Lina Ellis (Maintenance), and Jing Chen (District Design).

Toll Bridge Program Oversight Committee (TBPOC) approved on May 9, 2013, in the amount of not to exceed $1,000,000.00 for rod testing.

CONCURRED BY:			
Construction Engineer:	William Casey, Sup TE	Date	5/1/13
Bridge Engineer:	CT Oversight, Wenyi Long, P.E.	Date	5/1/13
Project Engineer:	District Design, Jing Chen	Date	5/2/13
Project Manager:		Date	
FHWA Rep.:		Date	
Environmental:		Date	
Other (specify):	HQ, Rich Foley	Date	5/1/13
Other (specify):	Struct. Maint, Lina Ellis	Date	5/1/13
District Prior Approval By:		Date	
HQ (Issue Approve) By:		Date	
Resident Engineer's Signature:		Date	
			6-13-13

ESTIMATE OF COST		
	THIS REQUEST	TOTAL TO DATE
ITEMS	$0.00	$0.00
FORCE ACCOUNT	$500,000.00	$500,000.00
AGREED PRICE	$0.00	$0.00
ADJUSTMENT	$0.00	$0.00
TOTAL	$500,000.00	$500,000.00

FEDERAL PARTICIPATION

☐ PARTICIPATING ☐ PARTICIPATING IN PART ☑ NONE
☐ NON-PARTICIPATING (MAINTENANCE) ☐ NON-PARTICIPATING

FEDERAL SEGREGATION (if more than one Funding Source or P.I.P. type)
☐ CCO FUNDED PER CONTRACT ☐ CCO FUNDED AS FOLLOWS

FEDERAL FUNDING SOURCE	PERCENT

Change Requested by: Engineer

CCO: 314 Suppl. No. 1 Contract No. 04 – 0120F4 Road SF-80-13.2/13.9 **FED. AID LOC.:**

To: **AMERICAN BRIDGE/FLUOR ENTERPRISES INC A JOINT VENTURE**

You are directed to make the following changes from the plans and specifications or do the following described work not included in the plans and specifications for this contract. ***NOTE: This change order is not effective until approved by the Engineer.***

Description of work to be done, estimate of quantities and prices to be paid. (Segregate between additional work at contract price, agreed price and force account.) Unless otherwise stated, rates for rental of equipment cover only such time as equipment is actually used and no allowance will be made for idle time. This last percentage shown is the net accumulated increase or decrease from the original quantity in the Engineer's Estimate.

Extra Work at Force Account:

Provide additional funds.

The following revised plan sheets detail the changes addressed in this change order: 888S9, 888S10, 888S11, 888S12, 888S13, 888S14, 888S15, 888S16, 888S17, 888S18, 888S19, 888S20, 888S21, 888S22, 888S23, 888S24, and 888S25 (of 1204) as shown on sheets 2 through 18 of this change order.

Labor, equipment and material authorized by the Engineer, as necessary, will be paid in accordance with the provisions of Section 4-1.03D, "Extra Work" of the Standard Specifications and Section 5-1.24, "Force Account Payment" of the Special Provisions.

Estimated Cost of Extra Work at Force Account $475,000.00

Estimated Cost: Increase ☒ Decrease ☐ $475,000.00

By reason of this order the time of completion will be adjusted as follows: 0 Days

Submitted by

Signature **Resident Engineer** Darryl Schram, Senior T.E. **Date** 7-16-13

Approval Recommended by

Signature **Supervising Transportation Engineer** William Casey, Supervising T.E. **Date** 7-16-13

Engineer Approval by

Signature **Supervising Transportation Engineer** William Casey, Supervising T.E. **Date** 7-24-13

We the undersigned contractor, have given careful consideration to the change proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

NOTE: If you, the contractor, do not sign acceptance of this order, your attention is directed to the requirements of the specifications as to proceeding with the ordered work and filing a written protest within the time therein specified.

Contractor Acceptance by

Signature (Print name and title) BRIAN A. PETERSEN - PROJECT DIRECTOR **Date** 22JUL13

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

History Copy

CONTRACT CHANGE ORDER MEMORANDUM

TO: Tony Anziano, Program Manager /	FILE: **E.A.** 04 - 0120F4
	CO-RTE-PM SF-80-13.2/13.9
FROM: Darryl Schram, Senior TE	**FED. NO.** No
CCO#: **314** SUPPLEMENT#: **1** Category Code: **CHXX**	CONTINGENCY BALANCE (incl. this change) **$77,786,147.22**
COST: **$475,000.00** INCREASE ☑ DECREASE ☐	HEADQUARTERS APPROVAL REQUIRED? ☑ YES ☐ NO
SUPPLEMENTAL FUNDS PROVIDED: **$0.00**	IS THIS REQUEST IN ACCORDANCE WITH ENVIRONMENTAL DOCUMENTS? ☑ YES ☐ NO
CCO DESCRIPTION: Additional Funds Pier E2 Rod Testing	**PROJECT DESCRIPTION:** CONSTRUCT SELF-ANCHORED SUSPENSION BRIDGE

Original Contract Time:	Time Adj. This Change:	Previously Approved CCO Time Adjustments:	Percentage Time Adjusted: (including this change)	Total # of Unreconciled Deferred Time CCO(s): (including this change)
2490 Day(s)	**0** Day(s)	**501** Day(s)	**20** %	**3**

THIS CHANGE ORDER PROVIDES FOR:

Providing additional funds to perform sampling and testing of rods.

Contract Plan Sheets 884R1 "Pier E2 Bearing Details No. 2" and 887R2 "Pier E2 Shear Key Details No. 1" identify the anchor bolts for the Pier E2 Shear Keys and Bearings as 76 mm A354 Grade BD Bolts. These plan sheets require the bolts to be tensioned to 0.70 Fu (70% of their ultimate strength). Special Provisions Sections 10-1.47 "Spherical Bushing Bearing (Pier E2)" and 10-1.50 "Shear Key (Pier E2)" provide the specification requirements for the anchor bolts. Both of these specifications refer you to Special Provisions Section 10-1.59 "Steel Structures" which in turn refers you to various ASTM specifications including ASTMs A123, A153, A143, A354, etc. which provide further specifications for the manufacture and testing of the anchor bolts and hardware. While these references provide for the final mechanical properties and processes for the manufacture of the bolts, they do not specifically require hydrogen embrittlement testing for the anchor bolts.

Within days after tensioning was performed, the anchor bolts in the shear keys directly below the Eastbound and Westbound Orthotropic Box Girder (OBG) structures (known as Shear Keys S1 and S2) began to fail. A total of 32 out of the 96 anchor bolts broke before the Department directed the Contractor to reduce the anchor bolt tension to prevent further failures. A forensic metallurgic examination was jointly performed with both the Contractor's and Materials Engineering and Testing Services' (METS) metallurgical experts. It was determined that while the failed bolts' material properties did meet the contract specifications, the hardness properties were at the upper limit and the ductility and toughness properties were at the lower limit. Taking this high end hardness and low end ductility into account and combining it with a high tensile stress (0.70 Fu) makes this material more susceptible to the effects of hydrogen cracking (also known as hydrogen embrittlement). The metallurgical examination indicated that the bolts were susceptible to hydrogen embrittlement due to a lack of uniformity in the microstructure of the rods.

The anchor bolts at Shear Keys S1 and S2 are uniquely different from the anchor bolts at the remaining shear keys and bearings (known as Shear Keys S3 and S4 and Bearings B1, B2, B3, and B4) in that they were manufactured in 2008 as opposed to the remaining ones in 2010. In addition, due to physical limitations the anchor bolts at Shear Keys S1 and S2 have their anchors fully cast into the Pier E2 cap and are not replaceable, as opposed to the remaining shear keys and bearings which are thru bolted and thus replaceable. As such, Shear Keys S1 and S2 will require an alternate anchorage solution.

Multiple change orders will be issued for the alternate shear key solution including:
- CCO 312 furnish replacements for rods removed for testing,
- CCO 313 procure long lead time materials,
- CCO 314 perform work to remove, replace and test sample rods,
- CCO 319 fabricate saddles,
- CCO 320 shim temporary bearings,
- CCO 325 perform concrete and rebar demolition,
- CCO 326 core drill for through-cap tendons,
- CCO 327 install temporary work platforms, falsework, and saddles,
- CCO 328 furnish and install reinforcing bars,
- CCO 329 place shear key concrete,

•CCO 330 furnish and install post tensioning, and
•CCO 331 plan sheets

This change order (CCO 314 S1) will provide additional funds to remove rods and perform additional testing. Once removed, testing will be performed on the rods to verify their material properties and suitability for the project.

The total cost of this change order is $475,000.00 force account, which can be financed from the contingency fund. A detailed cost analysis is on file. The cumulative total of CCO 314 S0 and S1 is $975,000.00.

No time adjustment is warranted as this change order does not affect the controlling operation.

The Toll Bridge Project Oversight Committee (TBPOC) initially (April 11, 2013) approved $4.3 million to continue work on the Shear Key S1 & S2 anchor rod replacement strategy solutions and to procure long lead time materials. The TBPOC revised this approval (May 9, 2013) to include all E2 shear key anchorage work within the approved $4.3 million funding. At the June 6, 2013 TBPOC meeting the TBPOC revised this approval to $7.5 million. At the July 10, 2013 TBPOC meeting the TBPOC further revised this approval to $18 million. CCO's 313, 319, 320, 325, 326, 327, 328, 329, and 330 are specific to this approval.

In addition, at the May 9th meeting the TBPOC also approved $1 million for the anchor rods test program. CCO's 312 and 314 are specific to this approval.

The SAS risk register is carrying the risk "Fabrication and Installation of a bracket to secure shear keys to Pier E2" in the range of $8M to $15M for the work related to fabricating and installing a retrofit to act in the place of the A354 Grade BD rods manufactured in 2008. The SAS risk register is also carrying the risk - "B/D Rods at the Bearings of Pier E2 & Misc Locations (2010)" in the range of $500K to $6.5M to test the remaining A354 Grade BD rods. Delays to bridge opening should they occur are not considered in these risks but are captured to the extent they were known in March 2013 in the risk "Schedule Delays to Seismic Safety Opening".

This change order has concurrence from William Casey (Supervising TE), Tony Anziano (Program Manager), Rich Foley (HQ Oversight), Wenyi Long (Bridge Design), Lina Ellis (Maintenance), and Jing Chen (District Design).

CONCURRED BY:			
Construction Engineer:	William Casey, Sup TE	Date	6/29/13
Bridge Engineer:	CT Oversight, Wenyi Long, P.E.	Date	5/1/13
Project Engineer:	District Design, Jing Chen	Date	5/2/13
Project Manager:		Date	
FHWA Rep.:		Date	
Environmental:		Date	
Other (specify):	Struct. Maint, Lina Ellis	Date	5/1/13
Other (specify):	HQ, Rich Foley	Date	7/9/13
District Prior Approval By:		Date	
HQ (Issue Approve) By:		Date	
Resident Engineer's Signature:		Date	7-16-13

ESTIMATE OF COST	THIS REQUEST	TOTAL TO DATE
ITEMS	$0.00	$0.00
FORCE ACCOUNT	$475,000.00	$975,000.00
AGREED PRICE	$0.00	$0.00
ADJUSTMENT	$0.00	$0.00
TOTAL	$475,000.00	$975,000.00

FEDERAL PARTICIPATION

☐ PARTICIPATING ☐ PARTICIPATING IN PART ☑ NONE
☐ NON-PARTICIPATING (MAINTENANCE) ☐ NON-PARTICIPATING

FEDERAL SEGREGATION (if more than one Funding Source or P.I.P. type)
☐ CCO FUNDED PER CONTRACT ☐ CCO FUNDED AS FOLLOWS

FEDERAL FUNDING SOURCE	PERCENT

CONTRACT CHANGE ORDER

Change Requested by: Engineer

CCO: 314 Suppl. No. 2 Contract No. 04 – 0120F4 Road SF-80-13.2/13.9 **FED. AID LOC.:**

To: **AMERICAN BRIDGE/FLUOR ENTERPRISES INC A JOINT VENTURE**

You are directed to make the following changes from the plans and specifications or do the following described work not included in the plans and specifications for this contract. ***NOTE: This change order is not effective until approved by the Engineer.***

Description of work to be done, estimate of quantities and prices to be paid. (S… …nd force account.) Unless otherwise stated, rates for rental of equipment cover only such time as e… …time. This last percentage shown is the net accumulated increase or decrease from the origin…

DRAFT

Extra Work at Force Account:

Provide additional funds.

The following revised plan sheets detail the changes addressed in this change order: 888S10R1, 888S11R1, 888S12R1, 888S13R1, 888S14R1, and 888S16R1 (of 1204) as shown on sheets 2 through 7 of this change order.

Labor, equipment and material authorized by the Engineer, as necessary, will be paid in accordance with the provisions of Section 4-1.03D, “Extra Work” of the Standard Specifications and Section 5-1.24, “Force Account Payment” of the Special Provisions.

Estimated Cost of Extra Work at Force Account $2,550,000.00

Estimated Cost: Increase ☒ **Decrease** ☐ **$2,550,000.00**

By reason of this order the time of completion will be adjusted as follows: 0 Days

Submitted by

Signature	**Resident Engineer** William Casey, Supervising T.E.	**Date**

Approval Recommended by

Signature	**Program Manager** Tony Anziano, Program Manager	**Date**

Engineer Approval by

Signature	**Program Manager** Tony Anziano, Program Manager	**Date**

We the undersigned contractor, have given careful consideration to the change proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

NOTE: If you, the contractor, do not sign acceptance of this order, your attention is directed to the requirements of the specifications as to proceeding with the ordered work and filing a written protest within the time therein specified.

Contractor Acceptance by

Signature	(Print name and title)	**Date**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CONTRACT CHANGE ORDER MEMORANDUM

DC-CEM-4903 (OLD HC-39 REV. 6/93) CT# 7541-3544-0

DATE: September 12, 2013

TO: Tony Anziano, Project Manager

FROM: Darryl Schram, Senior T.E.

FILE: **04-0120F4**
04-SF-80-13.2, 13.9

CCO NO.	SUPPLEMENT NO.	CATEGORY CODE
314	**2**	

CONTINGENCY BALANCE (including this change)

$2,550,000.00 INCREASE ☒ DECREASE ☐

HEADQUARTERS APPROVAL REQUIRED? YES ☒ NO ☐

SUPPLEMENTAL FUNDS PROVIDED:

IS THIS REQUEST IN ACCORDANCE WITH ENVIRONMENTAL COMMITMENTS? YES ☒ NO ☐

CCO Description: Additional Funds Pier E2 Rod Testing

DRAFT

THIS CHANGE ORDER PROVIDES FOR:

Providing additional funds to perform sampling and testing of rods.

Contract Plan Sheets 884R1 “Pier E2 Bearing Details No. 2” and 887R2 “Pier E2 Shear Key Details No. 1” identify the anchor bolts for the Pier E2 Shear Keys and Bearings as 76 mm A354 Grade BD Bolts. These plan sheets require the bolts to be tensioned to 0.70 Fu (70% of their ultimate strength). Special Provisions Sections 10-1.47 “Spherical Bushing Bearing (Pier E2)” and 10-1.50 “Shear Key (Pier E2)” provide the specification requirements for the anchor bolts. Both of these specifications refer you to Special Provisions Section 10-1.59 “Steel Structures” which in turn refers you to various ASTM specifications including ASTMs A123, A153, A143, A354, etc. which provide further specifications for the manufacture and testing of the anchor bolts and hardware. While these references provide for the final mechanical properties and processes for the manufacture of the bolts, they do not specifically require hydrogen embrittlement testing for the anchor bolts.

Within days after tensioning was performed, the anchor bolts in the shear keys directly below the Eastbound and Westbound Orthotropic Box Girder (OBG) structures (known as Shear Keys S1 and S2) began to fail. A total of 32 out of the 96 anchor bolts broke before the Department directed the Contractor to reduce the anchor bolt tension to prevent further failures. A forensic metallurgic examination was jointly performed with both the Contractor’s and Materials Engineering and Testing Services’ (METS) metallurgical experts. It was determined that while the failed bolts’ material properties did meet the contract specifications, the hardness properties were at the upper limit and the ductility and toughness properties were at the lower limit. Taking this high end hardness and low end ductility into account and combining it with a high tensile stress (0.70 Fu) makes this material more susceptible to the effects of hydrogen cracking (also known as hydrogen embrittlement). The metallurgical examination indicated that the bolts were susceptible to hydrogen embrittlement due to a lack of uniformity in the microstructure of the rods.

The anchor bolts at Shear Keys S1 and S2 are uniquely different from the anchor bolts at the remaining shear keys and bearings (known as Shear Keys S3 and S4 and Bearings B1, B2, B3, and B4) in that they were manufactured in 2008 as opposed to the remaining ones in 2010. In addition, due to physical limitations the anchor bolts at Shear Keys S1 and S2 have their anchors fully cast into the Pier E2 cap and are not replaceable, as opposed to the remaining shear keys and bearings which are thru bolted and thus replaceable. As such, Shear Keys S1 and S2 will require an alternate anchorage solution.

Multiple change orders will be issued for the alternate shear key solution including:

- CCO 312 furnish replacements for rods removed for testing,
- CCO 313 procure long lead time materials,
- CCO 314 perform work to remove, replace and test sample rods,
- CCO 319 fabricate saddles,
- CCO 320 shim temporary bearings,
- CCO 325 perform concrete and rebar demolition,
- CCO 326 core drill for through-cap tendons,
- CCO 327 install temporary work platforms, falsework, and saddles,
- CCO 328 furnish and install reinforcing bars,
- CCO 329 place shear key concrete,
- CCO 330 furnish and install post tensioning, and
- CCO 331 plan sheets
- CCO 337 furnish, install, and remove temporary rods

- CCO 338 shim permanent bearings

This change order (CCO 314 S2) will provide additional funds to remove rods and perform additional testing. Once removed, testing will be performed on the rods to verify their material properties and suitability for the project.

The total cost of this change order is $2,550,000.00 force account, which can be financed from the contingency fund. A detailed cost analysis is on file. The cumulative total of CCO 314 S0, S1, and S2 is $3,525,000.00.

No time adjustment is warranted as this change order does not affect the controlling operation.

The Toll Bridge Project Oversight Committee (TBPOC) initially (April 11, 2013) approved $4.3 million to continue work on the Shear Key S1 & S2 anchor rod replacement strategy solutions and to procure long lead time materials. The TBPOC revised this approval (May 9, 2013) to include all E2 shear key anchorage work within the approved $4.3 million funding. At the June 6, 2013 TBPOC meeting the TBPOC revised this approval to $7.5 million. At the July 10, 2013 TBPOC meeting the TBPOC further revised this approval to $18 million. CCO's 313, 319, 320, 325, 326, 327, 328, 329, 330, 337, and 338 are specific to this approval.

In addition, at the May 9th meeting the TBPOC also approved $1 million for the anchor rods test program. CCO's 312 and 314 are specific to this approval. TBPOC approval for an additional $2,725,000 for CCOs 312 and 314 is pending.

The SAS risk register is carrying the risk "Fabrication and Installation of a bracket to secure shear keys to Pier E2" in the range of $8M to $15M for the work related to fabricating and installing a retrofit to act in the place of the A354 Grade BD rods manufactured in 2008. The SAS risk register is also carrying the risk - "B/D Rods at the Bearings of Pier E2 & Misc Locations (2010)" in the range of $500K to $6.5M to test the remaining A354 Grade BD rods.

This change order will obtain concurrence from William Casey (Supervising TE), Tony Anziano (Program Manager), Rich Foley (HQ Oversight), Wenyi Long (Bridge Design), Lina Ellis (Maintenance), and Jing Chen (District Design).

CONCURRED BY:		**ESTIMATE OF COST**	
STRUCTURE REPRESENTATIVE	DATE	THIS REQUEST	TOTAL TO DATE
SR. BRIDGE ENGINEER	DATE	ITEMS	
		FORCE ACCOUNT	
FHWA REPRESENTATIVE	DATE	AGREED PRICE	
		ADJUSTMENT	
PROJECT ENGINEER			
OTHER (SPECIFIY)		**FEDERAL PARTICIPATION**	
		☐ PARTICIPATING ☐ PARTICIPATING IN PART ☒ NONE	
		☐ NON-PARTICIPATING (MAINTENANCE) ☐ NON-PARTICIPATING	
	DATE	FEDERAL SEGREGATION (IF MORE THAN ONE FUNDING SOURCE OR P.I.P. TYPE)	
		☐ CCO FUNDED PER CONTRACT ☐ CCO FUNDED AS FOLLOWS	
DISTRICT PRIOR APPROVAL BY	DATE	FEDERAL FUNDING SOURCE	PERCENT
HQ (ISSUE & APPROVE) (TO PROCEED) BY	DATE		
RESIDENT ENGINEER SIGNATURE	DATE		

This part updated by CadB

HC-39 Word(Rev.9/96)

TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE

CALTRANS · BAY AREA TOLL AUTHORITY · CALIFORNIA TRANSPORTATION COMMISSION

Memorandum

TO: Toll Bridge Program Oversight Committee (TBPOC) **DATE:** October 1, 2013

FR: Program Management Team (PMT)

RE: Agenda No. - 3d

Item- San Francisco-Oakland Bay Bridge Updates Demolition Update

---

Recommendation:
For Information Only

Cost:
N/A

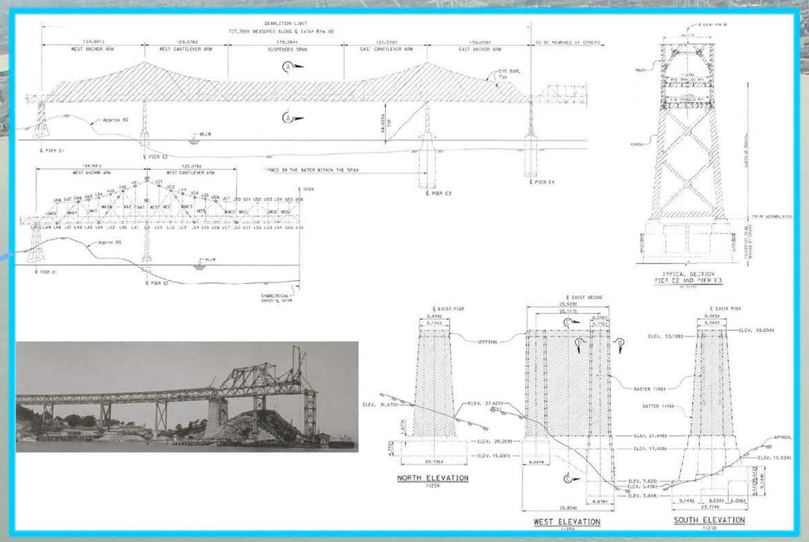
Schedule Impacts:
N/A

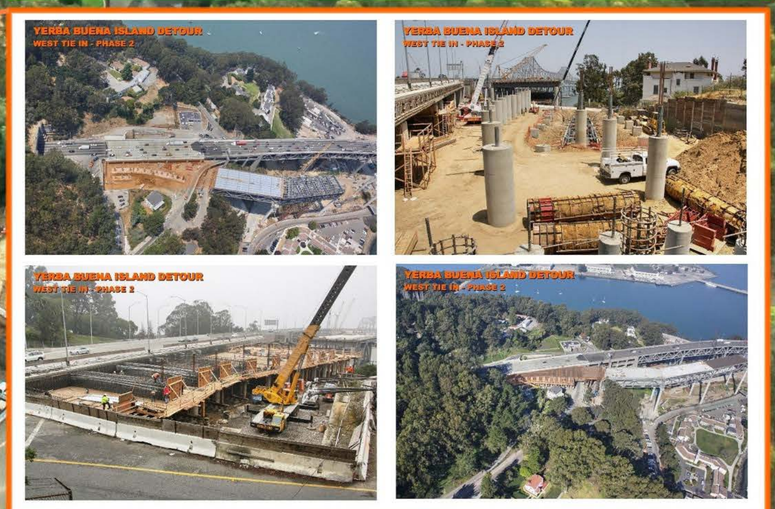
Discussion:
A verbal update on the demolition project will be provided at the TBPOC October 3 meeting.

Attached are related photos for discussion at the meeting.

Attachment(s):
1. Yerba Buena Island Phase II Project
2. Oakland Touchdown Phase II Project
3. Oakland Touchdown 2 – Stage 3
4. Bike/Pedestrian Path

YERBA BUENA ISLAND PHASE II PROJECT





OAKLAND TOUCHDOWN PHASE II PROJECT

TOLL PLAZA

METERING LIGHTS

PIER 7

MN LINE (PARTIAL)

I-80 WB

I-80 EB

BIKE / PEDESTRIAN PATH

STAIRS TO LOWER DECK

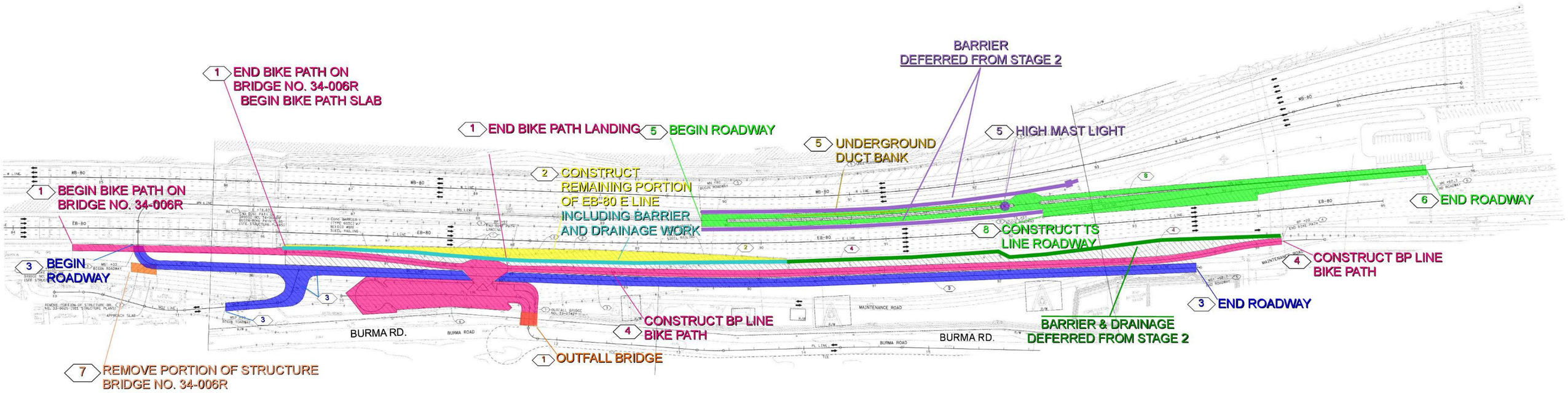
YBI2 ACCESS

BURMA RD.

MOLE SUBSTATION

OAKLAND TOUCHDOWN - 2

STAGE 3



TRAFFIC:

- WB-80 W LINE, EB-80 E LINE (TEMPORARY CONFIGURATION), BURMA ROAD, AND MAINTENANCE ROAD OPEN TO TRAFFIC.
- UNLESS OTHERWISE NOTED, ALL TRAFFIC LANES SHALL HAVE A Min WIDTH OF 3.3 m AT ALL TIMES.

STAGE 3 CONSTRUCTION:

1. CONSTRUCT BIKE PATH ON BRIDGE NO. 34-0006R, BIKE PATH SLAB, BIKE PATH LANDING AND OUTFALL BRIDGE NO. 33-0742Y (SEE STRUCTURE PLANS).
2. CONSTRUCT REMAINING PORTION OF EB-80 E LINE ROADWAY.
3. CONSTRUCT MS1 AND MS2 LINE ROADWAY.
4. CONSTRUCT BP LINE BIKE PATH.
5. CONSTRUCT REMAINING PORTION OF MN LINE AND UNDERGROUND DUCT BANK AND INSTALL HIGH MAST LIGHT.
6. CONSTRUCT PL LINE PARKING LOT.
7. REMOVE PORTION OF STRUCTURE BR. NO. 33-0025 (SEE STRUCTURE PLANS).
8. CONSTRUCT TS LINE ROADWAY.

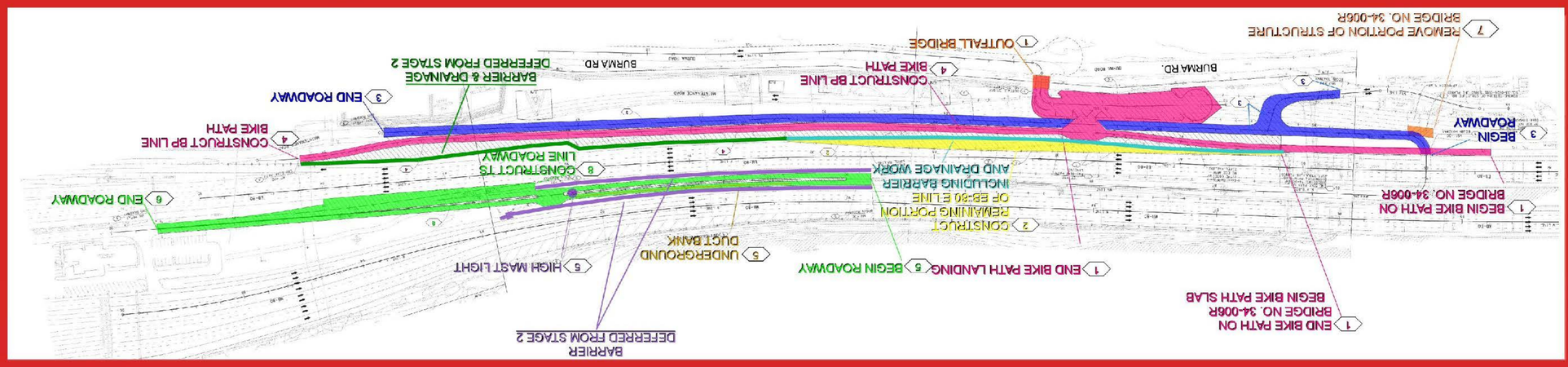
Designated Portion of Work 3: Complete all structural, electrical, mechanical, underground, and roadway work required for the completion of the permanent bike path, roadway, structure, and Maintenance Road (MS1 and MS2 lines), including landscaping along the bike path, eastbound Route 80, and Maintenance Road (MS1 and MS 2 lines). Designated Portion of Work 3 must be diligently prosecuted to completion before the expiration of 180 working days after completion of Designated Portion of Work 2. Liquidated damages are $10,500 per day starting on the first day after exceeding 180 working days for completion of Designated Portion of Work 3.

BIKE\PEDESTRIAN PATH

CALIFORNIA DEPARTMENT OF TRANSPORTATION

OAKLAND TOUCHDOWN PHASE III

YERBA BUENA ISLAND
PHASE II



TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE
CALTRANS · BAY AREA TOLL AUTHORITY · CALIFORNIA TRANSPORTATION COMMISSION

Memorandum

TO: Toll Bridge Program Oversight Committee (TBPOC) **DATE:** September 30, 2013

FR: Tony Anziano, Toll Bridge Program Manager, CT

RE: Agenda No. - 3e
Item- San Francisco-Oakland Bay Bridge Updates
Bike Path and Parking Update

Recommendation:
For Information Only

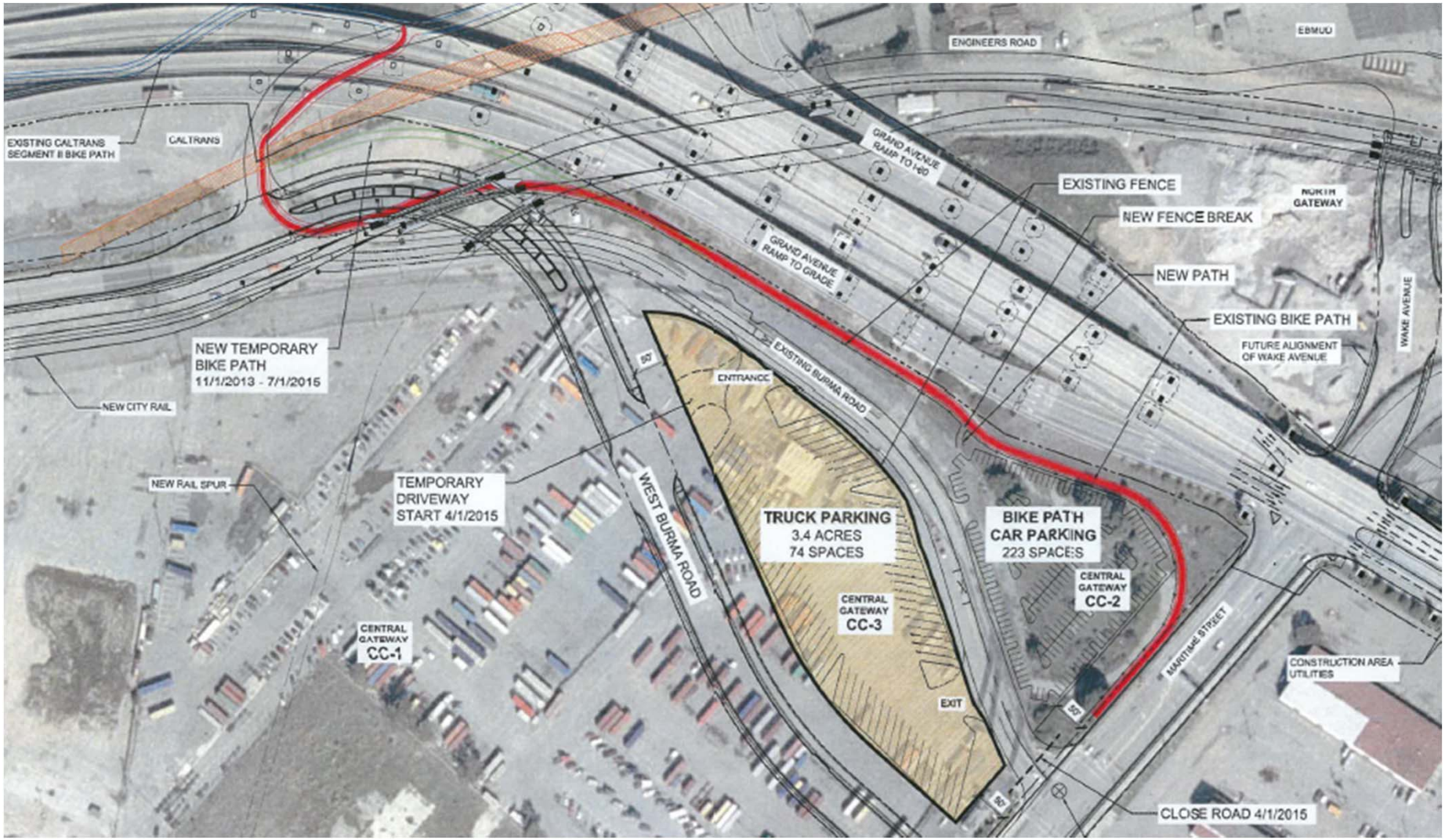
Cost:
N/A

Schedule Impacts:
N/A

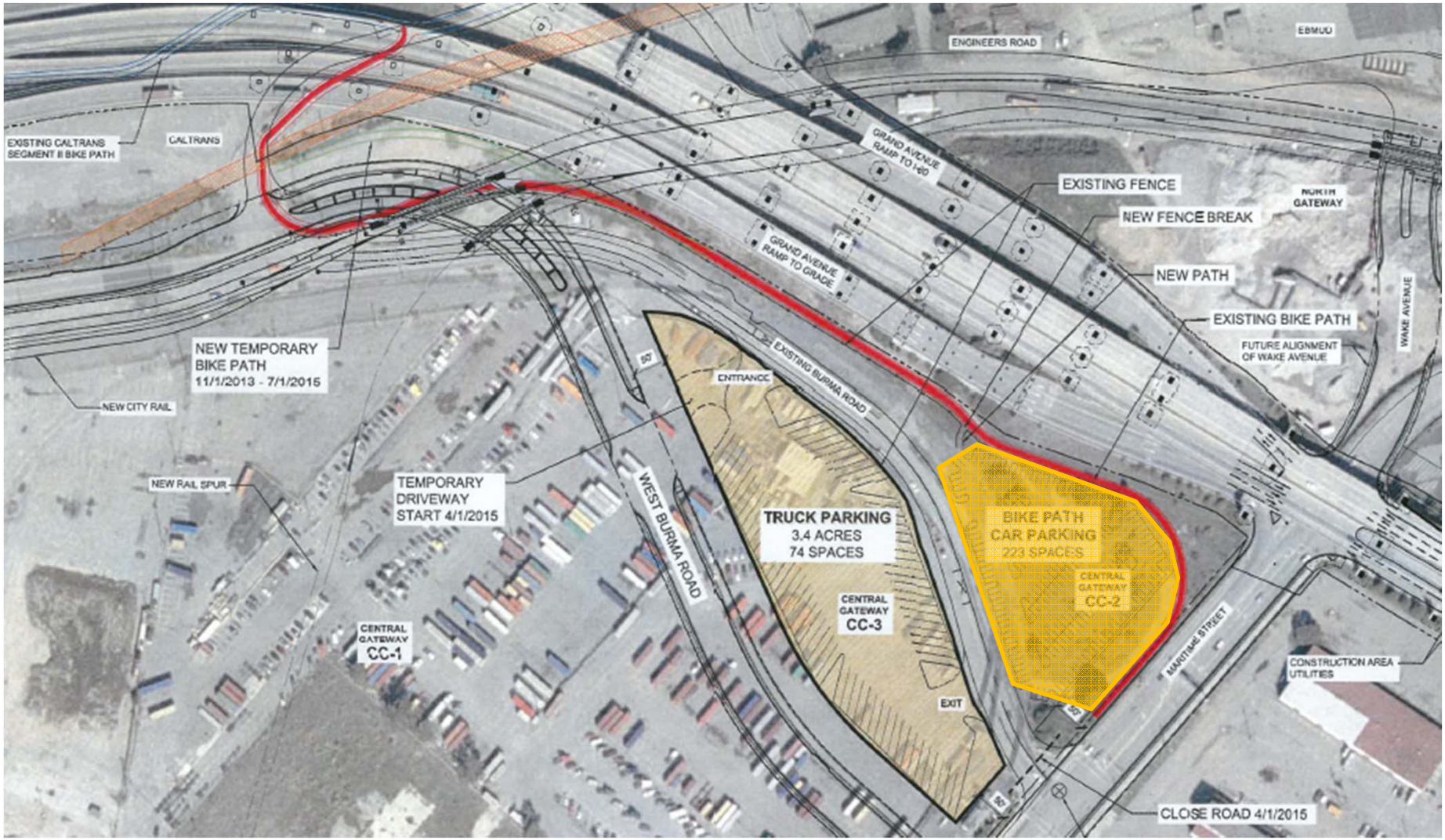
Discussion:
A verbal update on the bike path/parking status will be provided at the TBPOC October 3 meeting.

Attached are slides for presentation and discussion at the meeting.

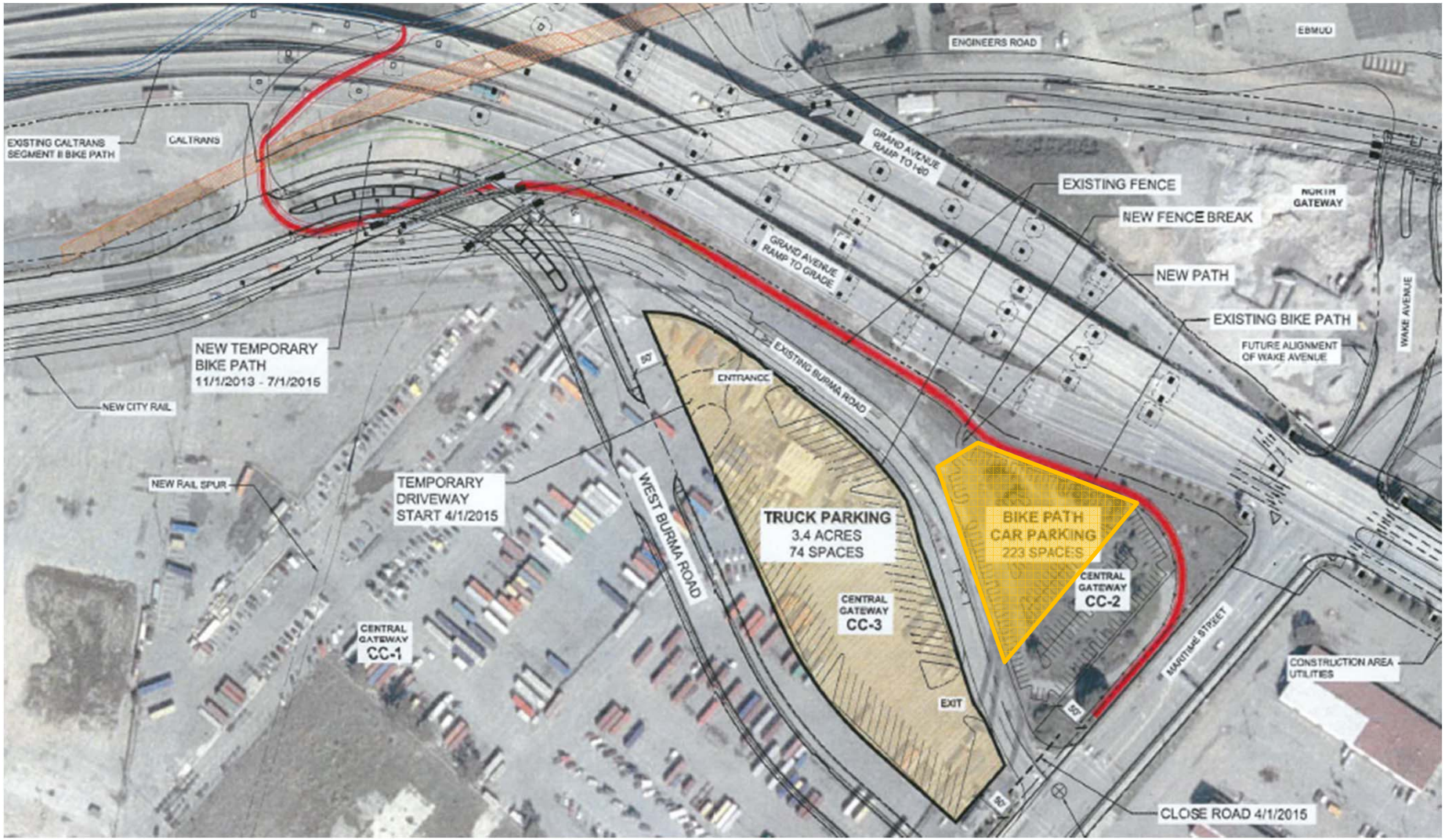
Attachment(s):
Bicycle Pedestrian Path Parking Presentation



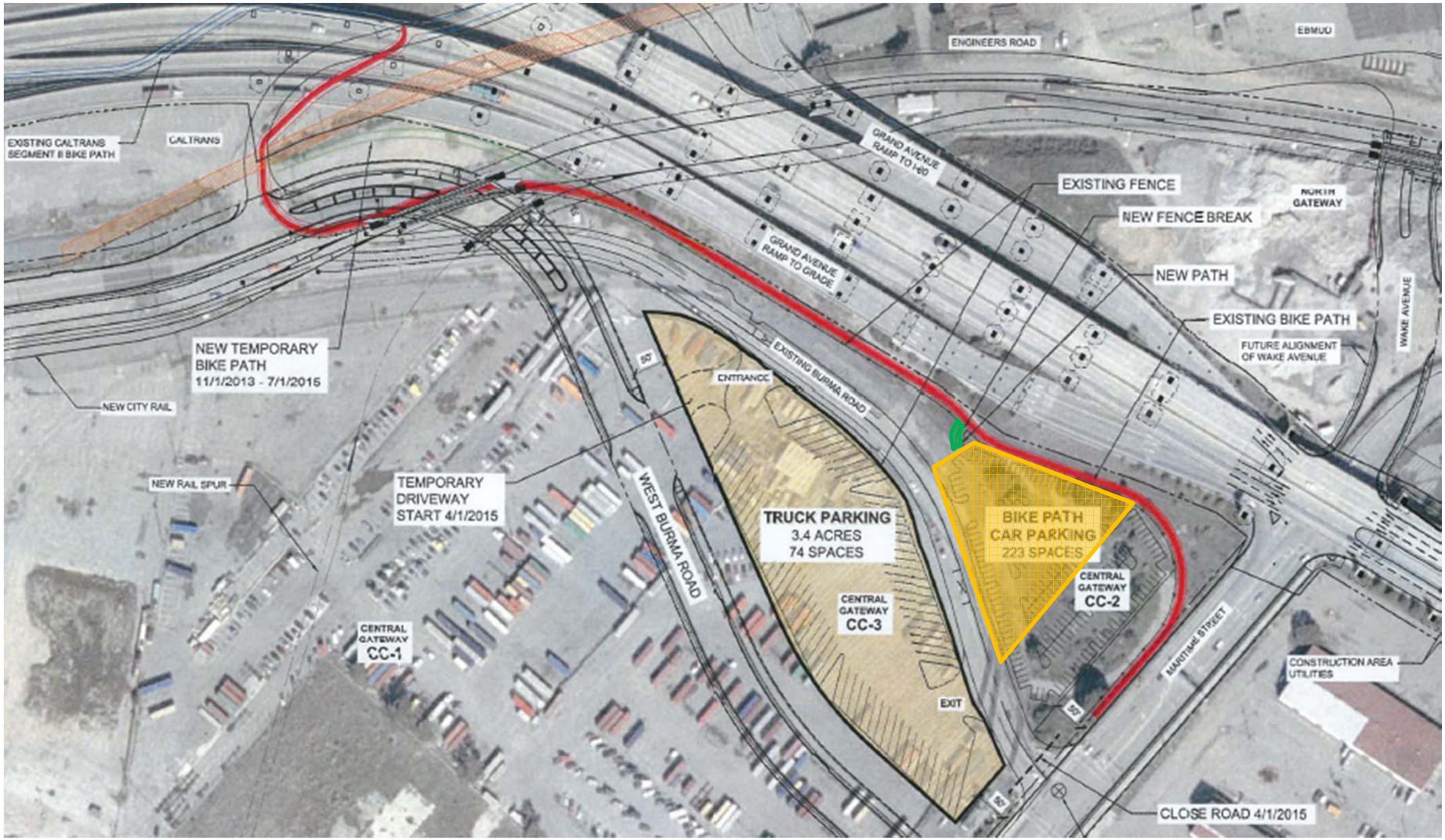
Segment 3 bicycle/pedestrian path in Red



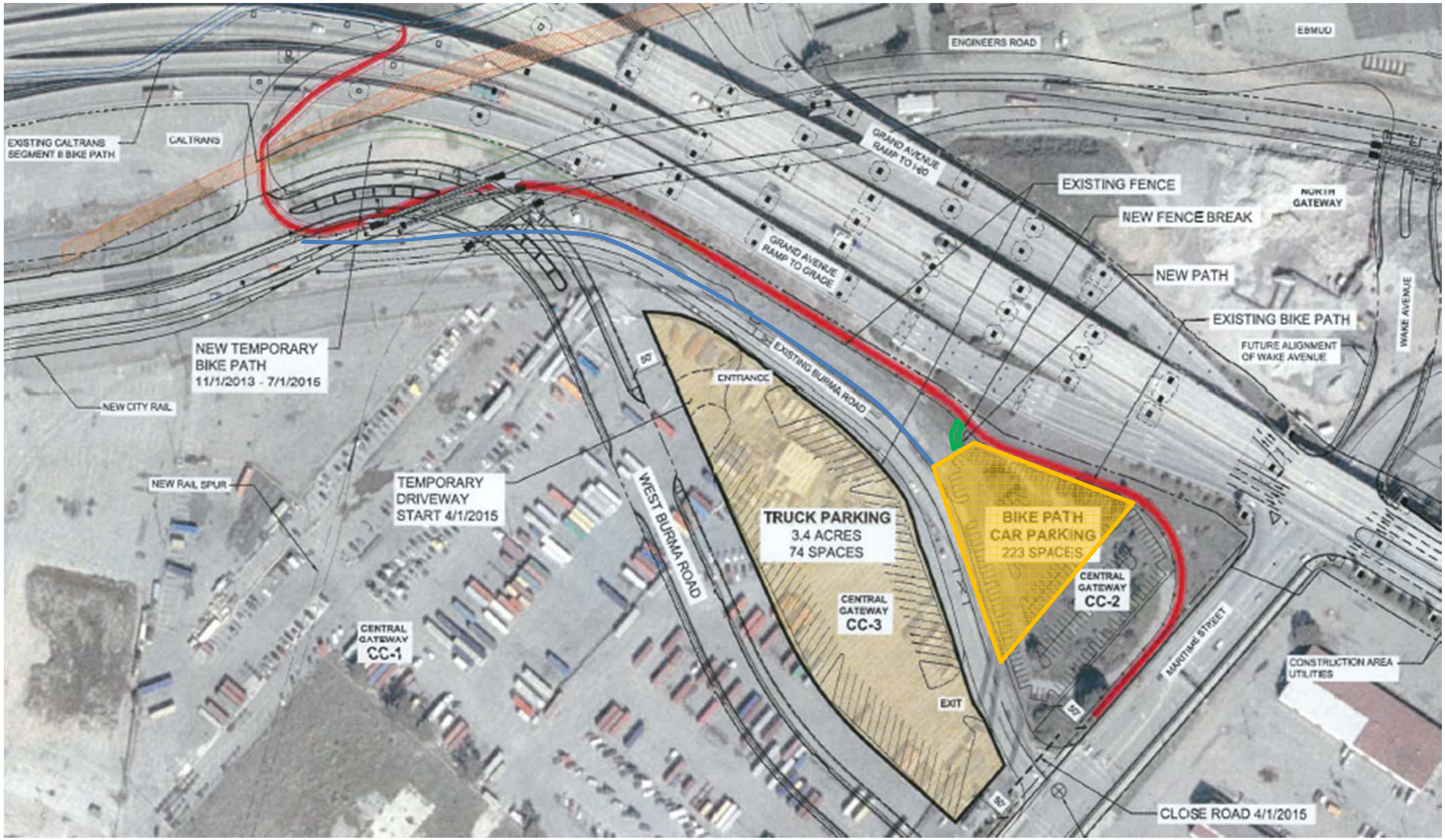
The City of Oakland will pave, fence and stripe the area in orange (the "pork chop")



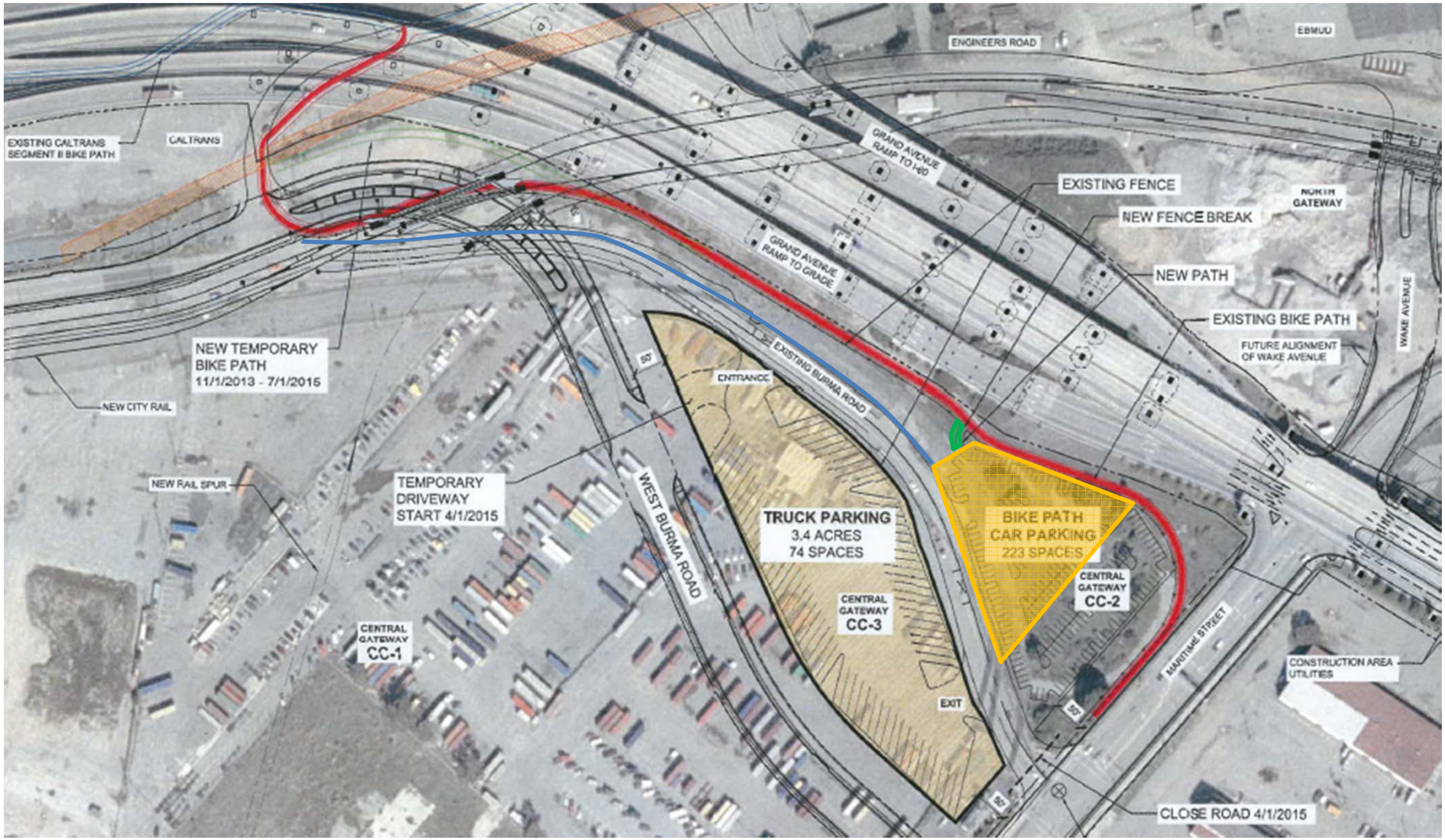
The Department will lease slightly more than half of the “pork chop” for bicycle/pedestrian path parking. There will be approximately 120 spaces.



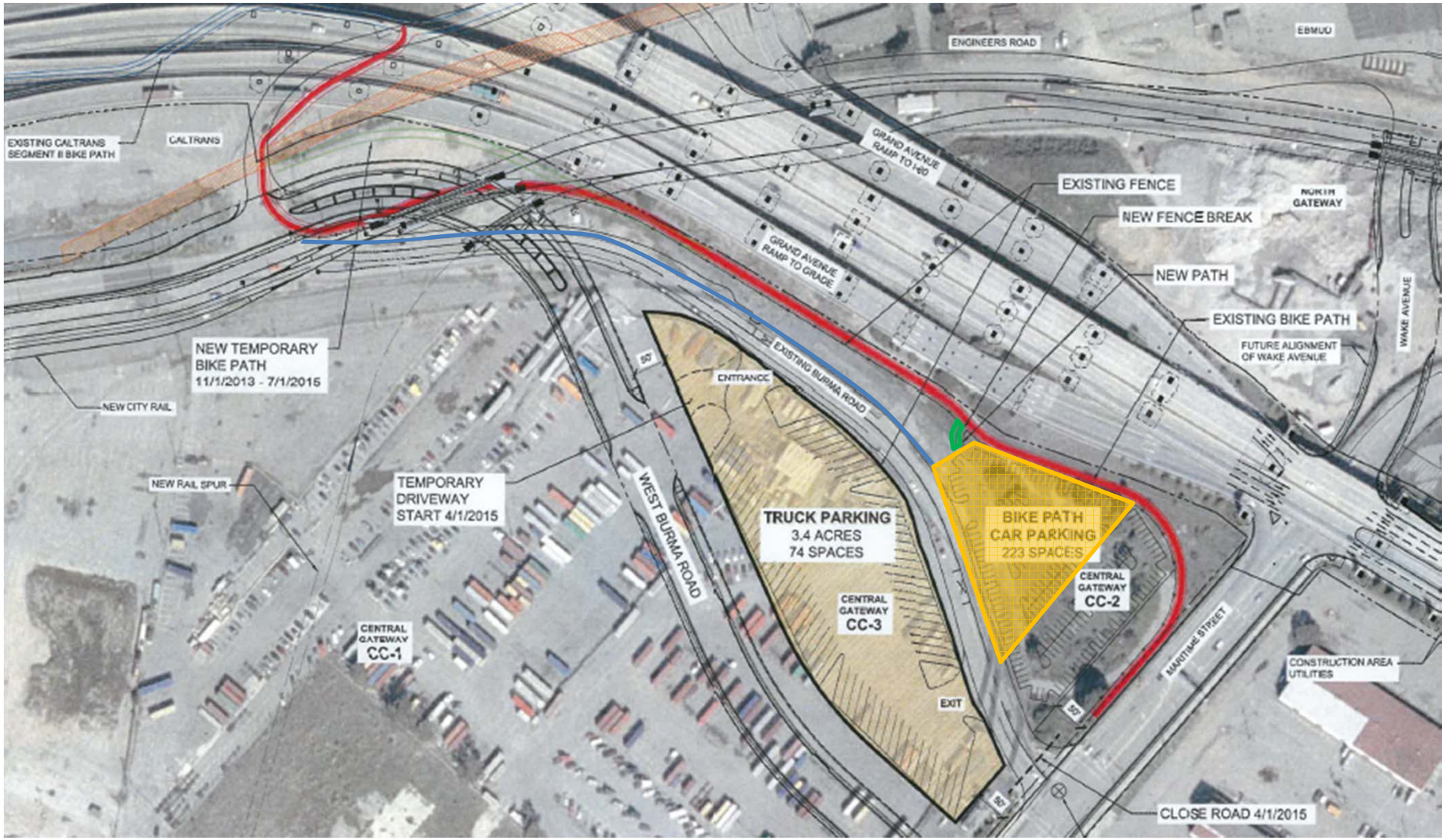
A new entry to the Segment 3 path will be created between the parking area and the path (shown in green). This entry is already in place.



The City of Oakland will put up a fence at the edge of pavement on Burma Road to prevent parking along Burma (shown in blue).



The City of Oakland will be responsible for security of the path parking lot. The lot will close approximately 1 hour after the path closes. Parking will be limited to 3 hours (it is currently limited to 2 hours in the dirt area). Construction of the lot should begin within the next 1-2 weeks and should take 3 weeks to complete.



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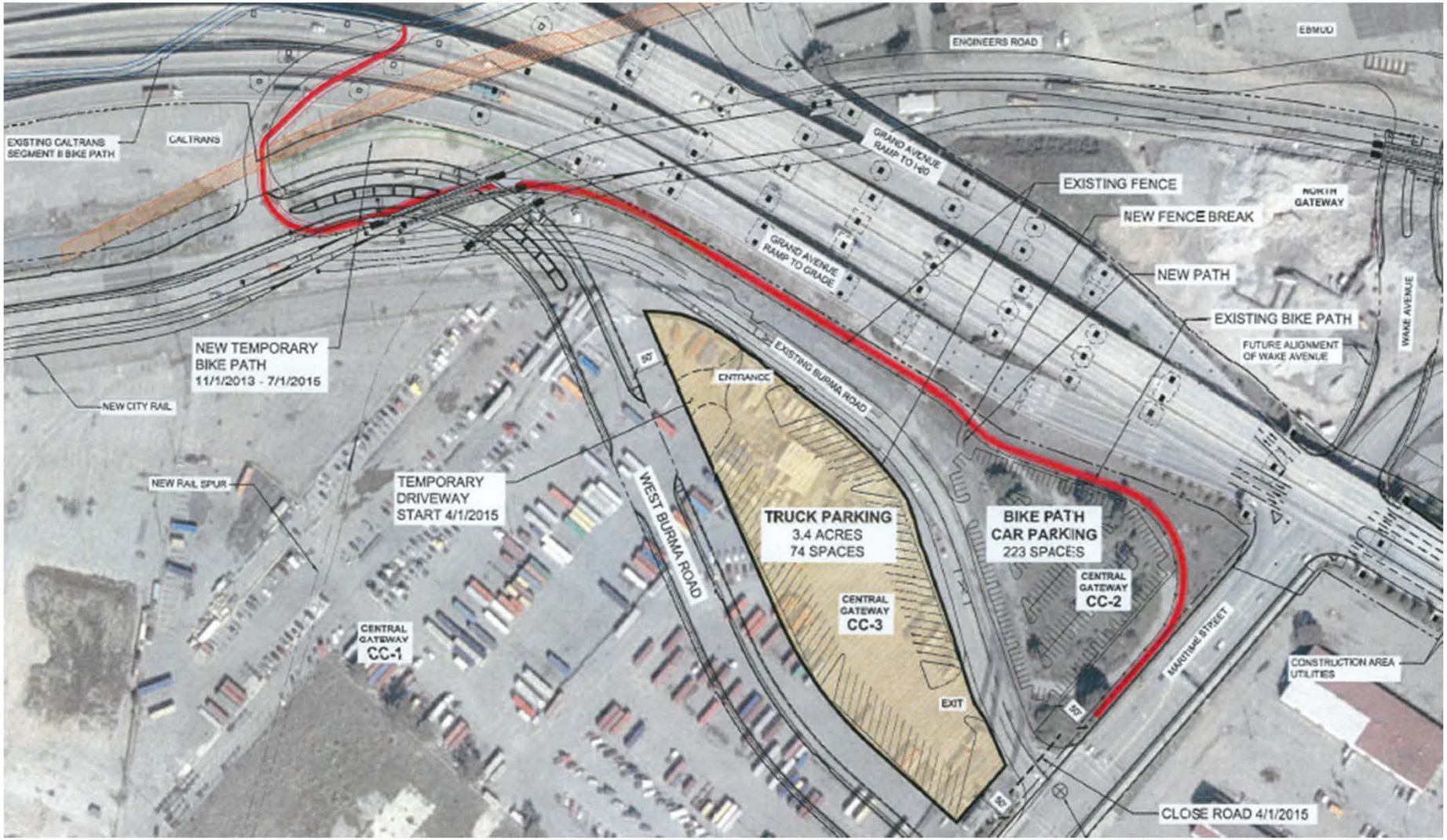
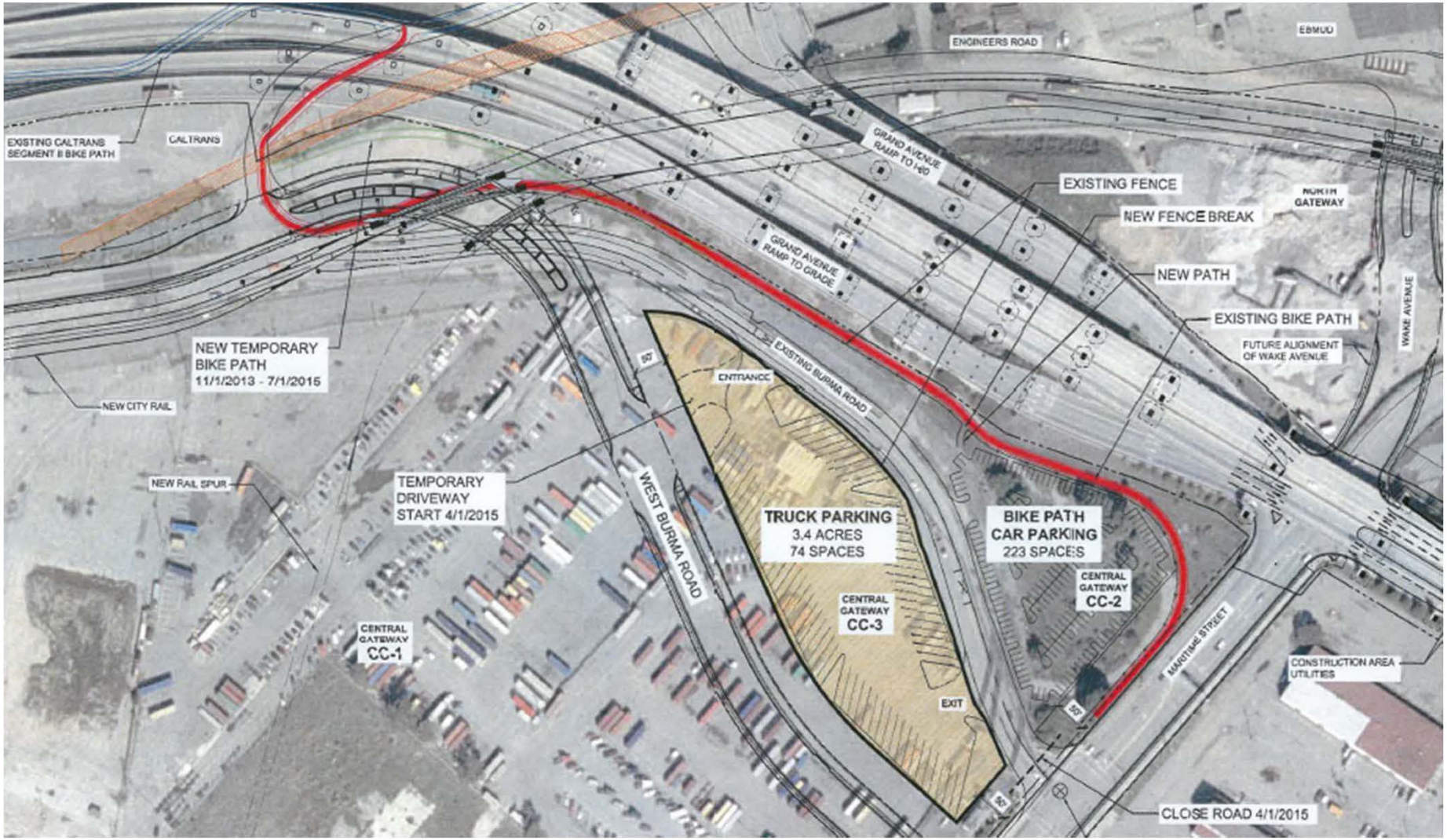

EXISTING CALTRANS SEGMENT 8 BIKE PATH
CALTRANS
ENGINEERS ROAD
EBMUD
GRAND AVENUE RAMP TO I-80
EXISTING FENCE
NORTH GATEWAY
NEW FENCE BREAK
GRAND AVENUE RAMP TO GRADE
NEW PATH
EXISTING BIKE PATH
WAKE AVENUE
FUTURE ALIGNMENT OF WAKE AVENUE
NEW TEMPORARY BIKE PATH 11/1/2013 - 7/1/2015
NEW CITY RAIL
EXISTING BURMA ROAD
ENTRANCE
NEW RAIL SPUR
TEMPORARY DRIVEWAY START 4/1/2015
WEST BURMA ROAD
TRUCK PARKING 3.4 ACRES 74 SPACES
BIKE PATH CAR PARKING 223 SPACES
CENTRAL GATEWAY CC-2
CENTRAL GATEWAY CC-3
CENTRAL GATEWAY CC-1
MARITIME STREET
CONSTRUCTION AREA UTILITIES
EXIT
CLOSE ROAD 4/1/2015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TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE
CALTRANS · BAY AREA TOLL AUTHORITY · CALIFORNIA TRANSPORTATION COMMISSION

Memorandum

TO: Toll Bridge Program Oversight Committee (TBPOC) **DATE:** September 27, 2013

FR: Dina Noel, Assistant Deputy Director Toll Bridge Program, CTC

RE: Agenda No. - 3e1

Item- San Francisco-Oakland Bay Bridge Updates
Bike Path & Parking Update
Oakland Touchdown No. 2 (OTD2) CCO 119-S0 – Stage 3 Impacts & Mitigation

Recommendation:
APPROVAL

Cost:
Not to Exceed $4,000,000.00

Schedule Impacts:
Mitigate delays to OTD2 completion

Discussion:
CCO 119-S0 in the not-to-exceed amount of $4,000,000.00 will compensate the contractor for the additional time and staging impacts created when the scope of work was increased to include the construction of the temporary bike path, and will mitigate potential delays to the overall contract completion schedule.

Stage 2 encompassed the work required for the Labor Day Weekend Seismic Safety Opening (LDWSSO). Stage 3, at a bid price of $12 million was originally expected to be completed in 6 months. The main items of work in stage 3 include construction of the permanent bike path and the eastbound drainage system. When the temporary bike path was added to the OTD2 contract, the original time to complete the stage 3 work increased from 6 months to 9 to 12 months, and the original estimate increased by $2 million.

This contract change request is for a not-to-exceed amount of $4 million, $2 million owed to the contractor for the added scope, plus an additional $2 million to mitigate potential delays. Currently, if mitigation delays are not considered, contract completion could be optimistically achieved in 9 months. However, in anticipation of inclement weather the risk of shutting down and the potential for flooding are very high. By providing additional flexibility in the contract to direct

the contractor to work around the clock, shut down delays are minimized, construction of the drainage system is accelerated, flooding of the job site is avoided, and the opportunity to build the permanent bike path in less time (from 9 to 12 months to 4 to 6 months) is increased providing a safer environment to pedestrians and bicyclists sooner by eliminating their constant exposure to the construction zone.

In more detail, delays to the stage 3 construction are attributed to: the time it took to cleanup and haul-off the concrete material from the SFOBB upper deck demolition work done during the LDWSSO and the following executed CCOs:

1) CCO No. 402 - construction of the temporary bike path
2) CCO No. 87 – LDWSSO – pushed the construction of 1,280 meters of concrete barrier and 2 adjacent drainage systems from stage 2 into stage 3.

Separate CCOs will be issued to address the removal of the temporary bike path structure and the traffic switch to the permanent bike path.

Risk Management:

This change order provides compensation for items that were covered in the OTD2 Risk Register. Since this change will address many issues, there are several identified risks that can be used to address this change:

Risk ID #7 - "Construction impacts public traffic more than provided for in the contract"

Risk ID #25 - "Design Evolution"

Risk ID #29 - "Delay from SSO to Contract Completion"

Risk ID #30 - "Removal of the temporary bike path - Roadway"

The aggregate 50% probable for these risks is in excess of the amount being requested to address this change.

Attachment(s):

1) Draft CCO NO. 119
2) Draft CCO No. 119 CCO Memo

CONTRACT CHANGE ORDER

Change Requested by: Engineer

CCO: 119	Suppl. No. 0	Contract No. 04 - 0120M4	Road 04-ALA-80-1.6/2.7	FED. AID LOC.: NO FED AID

To: **FLATIRON WEST INC**

You are directed to make the following changes from the plans and specifications or do the following described work not included in the plans and specifications for this contract. ***NOTE: This change order is not effective until approved by the Engineer.***

Description of work to be done, estimate of quantities and prices to be paid. (Segregate between additional work at contract price, agreed price and force account.) Unless otherwise stated, rates for rental of equipment cover only such time as equipment is actually used and no allowance will be made for idle time. This last percentage shown is the net accumulated increase or decrease from the original quantity in the Engineer's Estimate.

As ordered by the Engineer, the Contractor shall work extended shifts, provide additional labor and equipment resources and expedite material deliveries in order to mitigate delays to the completion of the following Stage 3 items of work:

1) Construction of the remaining southern portion of the eastbound mainline (E Line) including all embankment, roadway section, concrete barrier, drainage, and topsoil.

2) Construction of the permanent bike path (BP Line) including the concrete bike path structure, the bike path ramp and landing, and the at grade bike path.

Compensation for all additional costs associated with this change order shall be paid as an adjustment of compensation in accordance with Section 4-1.03C “Changes in Character of Work” of the Contract Standard Specifications. Any adjustment in compensation is deferred and shall be compensated under a supplement to this change order as the costs are determined.

Estimated Cost: **Increase** ☐ **Decrease** ☐ **$0.00**

By reason of this order the time of completion will be adjusted as follows: Deferred

Submitted by		
Signature	**Resident Engineer** JEANNIE BALDERRAMOS	**Date**
Approval Recommended by		
Signature	**District Construction Deputy Director** TONY ANZIANO	**Date**
Engineer Approval by		
Signature	**District Construction Deputy Director** TONY ANZIANO	**Date**

We the undersigned contractor, have given careful consideration to the change proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as may otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

NOTE: If you, the contractor, do not sign acceptance of this order, your attention is directed to the requirements of the specifications as to proceeding with the ordered work and filing a written protest within the time therein specified.

Contractor Acceptance by		
Signature	**(Print name and title)**	**Date**

CONTRACT CHANGE ORDER MEMORANDUM

TO: DEANNA VILCHECK / JEANNIE BALDERRAMOS	FILE: **E.A.** 04 - 0120M4
FROM: JEANNIE BALDERRAMOS	**CO-RTE-PM** 04-ALA-80-1.6/2.7
	FED. NO. NO FED AID
CCO#: **119** SUPPLEMENT#: **0** Category Code: **CXXX**	CONTINGENCY BALANCE (incl. this change) **$487,183.55**
COST: **$0.00** INCREASE ☐ DECREASE ☐	HEADQUARTERS APPROVAL REQUIRED? ☑ YES ☐ NO
SUPPLEMENTAL FUNDS PROVIDED: **$0.00**	IS THIS REQUEST IN ACCORDANCE WITH ENVIRONMENTAL DOCUMENTS? ☑ YES ☐ NO
CCO DESCRIPTION: Stage 3 Impact & Mitigation	**PROJECT DESCRIPTION:** CONSTRUCT BRIDGES AND ROADWAY, AND ELECTRICAL SYSTEM

Original Contract Time:	Time Adj. This Change:	Previously Approved CCO Time Adjustments:	Percentage Time Adjusted: (including this change)	Total # of Unreconciled Deferred Time CCO(s): (including this change)
1140 Day(s)	**DEF** Day(s)	**0** Day(s)	**0** %	**0**

THIS CHANGE ORDER PROVIDES FOR:

Mitigating Department delays to the Stage 3 construction to the eastbound mainline freeway and permanent bike path.

This contract, the Oakland Touchdown 2 (OTD2) provides for the construction of the last remaining concrete box girder frame of the Oakland Touchdown structure and the construction of the remaining eastern roadway approach as part of the new east span of the San Francisco Oakland Bay Bridge (SFOBB).

Stage 3 of the contract stage construction plans call for the construction of the southern shoulder of the eastbound mainline freeway, the construction of the permanent bike path accessing the new SFOBB east span and the construction of maintenance roads in the center median and to the south of the freeway. The work is specified to be completed within 180 working (calendar) days after the completion of Stage 2 traffic switch which placed traffic on the new east span.

This Stage 3 work has incurred Department caused delays resulting from the following actions:

1) Change Order No. 402 provided for the construction of a temporary bike path to provide access to the new SFOBB east span bike path. This temporary bike path encroaches into the Stage 3 maintenance road and will require additional staging to complete the work.

2) Change Order No. 87 moved approximately 1,280 meters of concrete barrier from Stage 2 into Stage 3 in order to mitigate risks during the Stage 2 traffic switch.

3) The contract plans call for a portion of the existing SFOBB upper deck to be removed by an adjacent contract during the Stage 2 traffic switch. While the structure was removed during Stage 2, the cleanup and off-haul of the concrete and steel debris has extended several weeks beyond the weekend traffic switch and has delayed the beginning of the Stage 3 work.

Taken together, these delays will extend the Stage 3 work by 3 to 6 months beyond the planned 6 month duration and will accordingly extend the contract completion date. The inefficiencies and delay costs resulting from these impacts are estimated at up to $2,000,000.

Two specific delays will also results from the impacts being realized. First, the completion of the permanent drainage system for the eastbound mainline will be delayed resulting in a non-standard drainage on the mainline through the 2013/2014 winter along with potential flooding of the Stage 3 work site. Second, the delay to the completion of the permanent bike path will extend the use of the temporary bike path which includes mixed pedestrian and construction traffic through the Stage 3 construction area.

In order to mitigate these delays, this change order provides for the contractor to work extended shifts, provide additional labor and equipment resources and expedite material deliveries. It is anticipated that with these mitigation measures, the permanent eastbound drainage system can be completed within 4 months and pedestrian and bicycle traffic can be placed on the permanent bike path within 4 to 6 months versus the currently anticipated 9 to 12 months.

In addition to the estimated $2,000,000 in delay and inefficiency costs to be realized, the cost of mitigating the delays are

estimated at an additional $2,000,000 for a total cost of up to $4,000,000.

Compensation for the additional premium time and inefficient labor costs along with any additional material procurement cost will be determined in accordance with Section 4-1.03C “Changes in Character of Work” of the Contract Standard Specifications. Any adjustment in compensation is deferred and shall be compensated under a supplement to this change order as the costs are determined.

CONCURRED BY:		
Construction Engineer:	JEANNIE BALDERRAMOS	Date
Bridge Engineer:		Date
Project Engineer:	GABRIEL T CRUZ	Date
Project Manager:	KEN TERPSTRA	Date
FHWA Rep.:		Date
Environmental:		Date
Other (specify):	HASAN EL-NATUR	Date
Other (specify):		Date
District Prior Approval By:		Date
HQ (Issue Approve) By:	LARRY SALHANEY	Date
Resident Engineer's Signature:		Date

ESTIMATE OF COST

	THIS REQUEST	TOTAL TO DATE
ITEMS	$0.00	$0.00
FORCE ACCOUNT	$0.00	$0.00
AGREED PRICE	$0.00	$0.00
ADJUSTMENT	$0.00	$0.00
TOTAL	$0.00	$0.00

FEDERAL PARTICIPATION

☐ PARTICIPATING ☐ PARTICIPATING IN PART ☑ NONE
☐ NON-PARTICIPATING (MAINTENANCE) ☐ NON-PARTICIPATING

FEDERAL SEGREGATION (if more than one Funding Source or P.I.P. type)
☐ CCO FUNDED PER CONTRACT ☐ CCO FUNDED AS FOLLOWS

FEDERAL FUNDING SOURCE PERCENT